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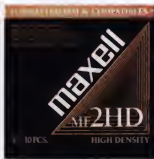
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TECHNOLOGY NEWS

Compiled by Cindy Krushenisky from AP and staff reports

Apple Decides To Share



Apple Computer had been in the red for the last few quarters and lost its head honcho. But don't count the company out just yet. Apple made a move earlier this year that may be the boost it needed.

Apple reached an agreement with the Motorola Computer Group that allows Motorola to license the Macintosh operating system. This means that along with making the motherboards for Apple systems, Motorola is authorized to license other companies that buy the boards to use the Macintosh operating system, without Apple's case-by-case permission. For years, Apple, unlike IBM, refused to license other companies to use its operating system—a move that many computer analysts claim hurt the Macintosh's market chances.

While this isn't the first Macintosh license that Apple has given, it's the most promising, given Motorola's marketing power. Other companies who receive licenses from Motorola will be able to create PowerPC clones, giving consumers a broader range of features, price, and support. Motorola will sell, support, and service Macintosh PowerPC Platform desktop systems, as well as sell powerful server systems to a more advanced audience. Motorola is likely to introduce the platform to China, pursuing a recent joint venture with the Panda Electronics Group there. ●

Check The Label

Someday browsing Internet sites may be similar to cruising the video store. Before you commit to a site, you can check the contents on a ratings label.

By this summer, several organizations will include their rating systems in popular World Wide Web browsers and major online services. The idea is to help parents get a clear idea of just what to expect as their family browses the Web.

The system created by the Recreational Software Advisory Council, called RSAC on the Internet (or RSACi), asks Web site creators to fill out questionnaires. A series of specific questions inquires about the level, nature, and intensity of the sex, nudity, violence, or offensive language found within the site. RSAC tabulates the results and produces the HTML advisory tags. (HTML, or Hypertext Markup Language, is the standard programming language used for creating Web pages.) A standard Internet browser or a blocking device configured to read the RSACi system can recognize the tags and let users view the rating or block the site.

Systems such as RSACi, as well as those by the SafeSurf parenting group, NewView, and Providence Systems, follow a new Internet Content Selection platform (PICS) that helps place ratings labels and was endorsed by businesses and organizations from the United States, Canada, France, Japan, and Taiwan. ●

The Stage Is A World

Shakespeare said all the world is a stage, but Robb Lovell considers the stage a world all its own. Lovell has been working on a project at Arizona State University for the past nine years in which the stage creates its own reality with the help of computers, rather than just actors and scenery.

Based on performers' movements, the Intelligent Stage chooses the music for dancers and decides what kind of light to shed on them. A computer "sees" the performers on stage through three video cameras and triggers lighting, prerecorded music, robotics, video, and graphics to react to the performers and create a mood. The computer monitors the images and calculates the motion over time. Slow dancer movements will trigger mellow music; faster movements conjure a more intense score.

Lovell and sound engineer John Mitchell put the Intelligent Stage into action in a production called "Time in the Eye of the Needle" last year at ASU and in Montreal. Special effects in each performance changed at the whim of the dancers.

Lovell says he'd someday like the Intelligent Stage to sense more subtle gestures. That, however, would require the computer not just to see what's happening on stage, but to understand it as well. Advances must be made in artificial intelligence before that's possible. ●

Surfboards On Sale



It seems like a good idea: Surf the Internet for a few hundred dollars, and avoid the price of a new PC. But how good is it?

A number of companies offer devices that let consumers connect to the Internet for a minimal investment in hardware. Some, like the machines from Reply Corp., are just stripped-down PCs optimized for online access. Some are dumb terminals (which rely on a source outside the terminal for processing), while others are variations that use television and cable modems. For instance, NetPhonic Communications has introduced a phone device that navigates the Internet via a phone, text-to-speech technology, and voice commands. Oracle Corp. is unveiling a line of systems that would connect in various ways, including a few that would use a television.

According to the market research firm International Data Corp., the current hype is overblown. While there is a small market brewing for low-cost Internet access devices (IADs), IDC says, it will offer little threat to PC vendors, at least for the next five years.

By the year 2000, IDC expects general-purpose PCs to be used 76.4% of the time to connect to the Internet, according to

worldwide unit shipments. Meanwhile, the stripped-down PCs may gain 2.6% of the market; dumb Internet terminals 3.2%; and television set-top boxes 6%; digital interactive consumer electronic machines such as video games, CD-I players, and digital video disc players will gain 11.8%. The problem, IDC says, is that technologies, such as cable modems and wireless communications, that would create a strong alternative market to PCs have yet to prove themselves. ●

The Eyes Have It



A French device could end the isolation of those who can't communicate with speech or body movement by letting them literally write with their eyes.

As a patient looks at a special keyboard, a laser-guided camera records the patient's eye movement from letter to letter. The camera feeds the selected letters into a computer, and the text appears instantaneously on a computer screen. Users only have to look at a key for less than a second for it to register. However, the system is sensitive enough that it won't register the letters users pass over, only the ones they stop on.

The device, which was displayed early this year at a Paris exhibition on language learning techniques, was the result of five years of research by scientists at the National Health and Medical Research Institute in Lille. If all goes as planned, it could eventually be fine-tuned so users could turn on the television, the radio, or lights; shut the door; or even log on to the Internet by gazing at a control panel.

Although prototypes now cost \$20,000, the humanitarian group that found funding for the project, Association Delta 7, expects the price to go down with large-scale production, possibly by next year. By midsummer, researchers expect to adapt the device for use in emergency rooms where badly injured patients who can't speak could use it to communicate with doctors. ●

AT&T Dials Up The Internet

As if you didn't have enough choices for Internet service providers, AT&T has thrown its hat into the Internet arena with its new WorldNet Service.

The offer seems attractive: five free hours of Internet access for AT&T long distance customers, with each additional hour costing \$2.50, or \$20 for unlimited access. (Customers of other long-distance services will pay a little more.) For that price, customers get navigational aids, areas for locating useful information, guided tours, the ability to block unsuitable sites, *Netscape Navigator* browser software, and electronic mail.

The popularity of a service from such a large challenger has other providers worried. AT&T had about 25,000 inquiries a day before WorldNet became available and so many orders for the software that it couldn't ship to most of the 212,000 people who requested it. In addition, WorldNet has caused a large dent in the stock performance of most major online services and national Internet service

providers and will likely lead to a brutal marketing battle. AT&T's plan threatens online firms because its costs for marketing and signing up new customers will probably be lower, and its reputation for service may outclass rivals. The issues are important because, while about 9.5 million Americans (according to the Emerging Technologies Research Group) are now signed up for online services, the market is volatile. The results of a recent study sponsored by the same group indicated about 47% of respondents planned to switch online providers because they are dissatisfied.

However, the concern of online competitors may all be in vain. AT&T's reputation may bring more novices onto the Internet, but eventually they may change to more localized providers for better service. For example, the fuss generated by the introduction of The Microsoft Network, which was included within Microsoft's Windows 95, subsided after MSN failed to grow as quickly as competitors feared (although it has gained 850,000 subscribers in seven months). And AT&T isn't the only newcomer; MCI is introducing a similar service for its long-distance customers. ●

In Due Process



The Communications Decency Act will go under the legal microscope as another coalition files suit against the new law that restricts data traffic considered indecent.

Calling themselves the Citizens Internet Empowerment Coalition, organizations such as Microsoft, Apple, America Online, the American Library Association, and the Society of Professional Journalists contend that the Internet is more like a newspaper than television and deserves the same First Amendment protection granted the press. The suit follows another lawsuit filed by a coalition led by the American Civil Liberties Union, which temporarily blocked the act. Historically, broadcast speech is more restricted because the number of channels is limited and the audience doesn't have control over what it sees. Until a decision is made, the Justice Department won't prosecute users, although it reserves the right to prosecute later any violations dating from passage of the law.

.....

Businesses offering software for rent, buy-back, try-before-you-buy, preview, or evaluation had better watch out. If they don't have written permission from the software's copyright holders, the Software Publishers Association will be gunning for them. The SPA recently filed six lawsuits against businesses coast-to-coast that allegedly allowed customers to rent computer diskettes and CD-ROMs in Portland, Ore., Los Angeles, Fayetteville, N.C., Austin, Texas, and Virginia Beach, Va. The federal lawsuits seek permanent injunctions forcing the companies to halt all software rentals, destroy illegally copied software, and pay legal fees and unspecified damages. Under copyright laws, the SPA says any type of renting is illegal; there's no way to ensure that diskettes aren't copied before they're returned to the store. ●

Netscape Nightmares

What does Microsoft chairman Bill Gates wake up thinking about every day? Internet browser market share. Gates' admitted morning unease results from a big change in the way people think about PCs. Someday you may not worry about what operating system your computer uses to process data, but rather the software you use to interact with data online. In fact, your operating system may be a browser that lets you access the vast amounts of data on the Internet.

Gates' worst dreams most likely involve Netscape. Today Microsoft holds about 90% of the operating system market; Netscape Communications and its Netscape Navigator have about 85% of the market for browsers, which let users access data on the Internet.

A major battle for influence among programmers underlies the companies' maneuvering. Should new programs be written for the operating system or the browser? To the winner go the spoils of selling the development tools programmers need to create new software.

The rivalry is likely to continue for a while before a clear victor emerges. Both companies recently made deals with the America Online (AOL) service. AOL first made a deal with Netscape to offer Navigator as a browser option for AOL subscribers, as well as AOL's Internet-only access software. Not to be out-done, Microsoft also made a deal with AOL the next day. They agreed Microsoft would build AOL access into its Win95 operating system and AOL would offer Microsoft's Internet browser as its standard, built-in browser. ●

Tech Shorts



CompuServe has restored access to 200 Internet newsgroups after the company recently incorporated parental controls and content restriction tools into its service. The company had suspended access following a mandate from the German prosecutor's office. The specific newsgroups, German officials claimed, violated German obscenity laws. Because CompuServe couldn't block access in just Germany, it had to block access to all its subscribers. The controls, CompuServe says, will put the power of content access where it belongs—with individual users. Similar Internet parental controls are already in place in most of the popular online services....

If you thought politics made strange bedfellows, wait 'til you see what's going on in the software circles. Two old Cold War enemies, former CIA Director William Colby and ex-KGB General Oleg Kalugin, teamed up in a computer game that features their real-life espionage experience. In Activision's *Spycraft: The Great Game*, a politician is shot by an assassin, and the player has to discover who dunit. Along with a lot of James Bond-like gizmos, players use a fictional intelligence communications network that really goes online to access Web pages for the CIA and other federal agencies. Activision also hired James Adams, espionage author, to write the game. Will such games replace movies? It's doubtful, Activision officials say, but they will be just as big as the big screen. ●

Product Previews



TWO WORLDS COLLIDE:

Gateway 2000, operating near a South Dakota cornfield, recently unveiled its "Field of Dreams" project for the world: a computer/television entertainment system.

The system, called Destination, combines a 31-inch computer monitor and a Pentium-based PC with special accessory cards for high-quality sound and video. Buyers can use the wireless keyboard or remote control to flip back and forth between a television show and the Internet. The TV show even can be put in a portion of the screen while data is viewed in the rest.

Why not use a television set? Ordinary televisions can't display text without having the words appear as if they're shifting around a bit. So the company designed the product around the better-looking computer monitor technology. In fact, the big screen is the most expensive part of the system and, Gateway says, will be the hardest to keep in stock.

Destination puts mail-order Gateway 2000, rated in the top five computer companies, at the front of the colliding worlds of computers and consumer electronics. The systems were made available in April for prices ranging from \$3,500 to \$4,700, depending on the system configuration. But, of course, the big question is: If Gateway builds them, will consumers come? (For more information, contact Gateway 2000 at 800/846-2000 or 605/232-2000.)

STORAGE WARS: There's a new battle brewing over your storage preferences.

While you probably know about hard drives, diskettes, CD-ROMs, and tape drives, there are several new options braving the home front. Compaq, 3M, O.R. Technology, and Matsushita-Kotobuki Electronics Industries have introduced their champion: the LS-120 diskette drive that stores up to 120 megabytes (MB) of information on a 3.5-inch diskette using a combination of optical and magnetic means. Iomega's Zip drive can store up to 100MB on a single magnetic cartridge.

Which will earn you dollar? The LS-120 Diskette technology is nice because the diskettes look like standard 3.5-inch diskettes and are backwards compatible, meaning you can store 1.44MB of information on a LS-120 diskette in a standard diskette drive or use a standard 3.5-inch diskette in a LS-120 drive. Iomega cartridges work only in Iomega drives; however, they now are available as internal and external units. Standalone drives won't be available with LS-120 technology until later this year; the drives now are found only in Compaq computer systems.

It's unlikely, however, that consumers will knock any player out of the race. In fact, consumers may prefer an assortment of storage media, each with its benefits. (For more information, contact 3M at 800/888-1889 ext. 33 or Iomega at 800/697-8833.) ●

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Generation CPU?



home, balancing its use between entertainment and work or school.

Members of this generation were sitting behind the screen of a PC much earlier than they sat behind the wheel of a car. Of those people surveyed, 70% under age 25 first used a computer before they were 10 years old. Of the respondents under age 11, 29% learned to use a computer before the age of five.

The contemporary computer field is often viewed as male-dominated. That's definitely not the case with this age group. An equal number (70%) of women under the age of 25 also began using computers prior to age 10.

The Microprocessor Generation clearly is not intimidated by this technological tool. In fact, two-thirds (66%) of people under the age of 25 consider themselves either "intermediate," "expert," or "power users." Given a list of words to describe computers, this generation chose adjectives such as "cool" (58%), "useful" (57%), and "fascinating" (44%).

"We included some negatives

as well, such as 'frightening' and 'would rather not deal with,'" Koon says. "But these didn't garner a lot of response."

This new generation believes computers will be the tool to carry us into the next century. According to the survey, more than 60% of the people surveyed think the computer will be the most important device in their lives by the year 2000, far more than other technologies such as cars, televisions, or telephones.

This group also is realizing the universal potential of the Internet. More than half (55%) are already users, and 59% believe that by the year 2000, they will receive most of their news via the Internet rather than through radio or TV (31%) or print (10%).

This generation will have even greater numbers of children using computers at an even earlier age. "As we move ahead, these kids will have kids who are going to have a whole different way of working, learning, and playing," Koon says. ●

If the buzzword Generation X is getting a little annoying, try out the latest label: the "Microprocessor Generation." According to a recent survey of more than 3,200 visitors to the "America's Smithsonian" exhibition in Los Angeles, members of this generation, who were born since the 1971 invention of the microprocessor, are heavily into their personal computers.

Tracy Koon, corporate affairs manager at Intel Corp., says the survey was intended to test this age group to see if its attitudes toward computers differed from those of

the population at large. "The results were overwhelming," she says.

The survey shows how important members of this generation believe computers are. Given \$2,000 to spend on electronic products, almost half (48%) said they would use the money for a computer system. Less than one-third (29%) would spend the cash on a big-screen TV or a home entertainment system, and only 16% would buy a stereo system.

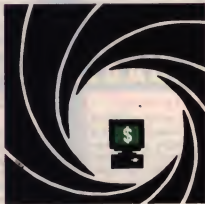
Most of this generation already owns a computer, and they're not just playing games with it. Three-quarters (72%) of the respondents have a computer at

Bond, Savings Bond.

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increase in value, and the final maturity date.

For example, we entered a \$50 Series EE bond that was issued in December 1989 and bought for \$25. The bond currently is worth \$35.66, has earned \$10.66 in interest, will next increase in value on June 1, and will stop earning interest in December 2019.

So what can you do with this information? By comparing interest rates, you can reinvest a bond at a higher interest rate or avoid cashing in higher yielding bonds.

Being aware of the maturity rate can keep you from losing

interest when you cash it in. And by knowing the final maturity date, you can be sure to cash in the bond before it stops earning interest.

Although it's a bit pricey at \$29.95, comes on DOS diskettes, and requires updates each year (another \$24.95), if you have a lot of money in savings bonds and are unsure about calculating interest, this program may be worth the extra investment.

For More Information:

The United Savings Bank Consultant
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(800) 717-2663
(908) 280-1440 ●

Checkmate!

If the game of grandmasters has you hearing "checkmate" considerably more than saying it, you're a likely candidate for *Maurice Ashley Teaches Chess* from Davidson & Associates and Simon & Schuster.

Maurice Ashley has been crowned the "John Madden of chess" because of the colorful commentary he offers at ESPN chess tournaments. The International Master also has been acclaimed for coaching two Harlem school chess teams.

Instead of just plowing through terminology, Ashley uses sports and real-life analogies to bring the game down-to-earth. And unlike other chess programs that introduce the pieces and a few moves, this product includes interactive challenges that sharpen your skills on three playing levels. Some of the challenges let you "make the call," then Ashley explains which move was best and why.

Users start with the basics, then learn a little strategy. You can brush up on how to "seek and destroy" your opponent or escape a trap and learn how to control the center, trap pieces, and put your opponent in checkmate. You even can watch narrated games of the grandmasters in which Ashley explains moves through a "video chalkboard" method, similar to those used for televised sporting events.

Like all the other chess games available, you can engage the computer, another player, or watch the computer play itself. There are six different environments you can choose from, from a traditional chess set to super-hero characters, and three levels of difficulty. Or, you can customize more precisely how the computer plays by adjusting the difficulty from one to 100 and setting how many moves ahead the computer can plan for.

We did improve our chess skills, although they probably weren't the stuff of champions to begin with. With the drills and challenges, you actually develop long-range, critical-thinking skills. There's a lot of interactive learning, video, and sound woven throughout the program, but some of the cartoon characters used for Ashley's chess analogies can be a little corny. We recommend the product for beginner or intermediate chess players who want to get a better feel for the game. *Maurice Ashley Teaches Chess* is available for about \$50 on CD-ROM for Windows 3.1 or Windows 95.

For More Information:

Maurice Ashley Teaches Chess
Davidson & Associates
(800) 457-8357
(310) 793-0600 ●



A video chalkboard in *Maurice Ashley Teaches Chess* lets the International Master demonstrate moves.



Was Michelangelo Overrated?

Nothing has been made this noticeable by its absence since the baseball strike ended. Michelangelo, after months of anticipation, hardly showed up on his biggest day—his birthday, no less. It's a good thing Michelangelo the artist had a better work record than his Computer Age namesake; otherwise, the Sistine Chapel may have never been finished.

The *Michelangelo* computer virus' latest work, or lack thereof, probably didn't dash too many hopes, however. Though computer users around the world anticipated the annual appearance of the virus on March 6 (the artist's birthday), it's doubtful anyone was disappointed when the virus came in, and went out, like a lamb. (Viruses are files that replicate themselves throughout a computer system, destroying data and interrupting work.) Antivirus software manufacturers reported the number of Michelangelo attacks called into them at between one and 52. Even at the high end of that range, the number of attacks is minuscule when compared to the number of PCs and files transferred everyday.

Michelangelo's meager 1996 performance follows its trend of weak

showings since attacks peaked at 26 (as reported to S&S Software International) in 1992. That year, warnings of worldwide PC malfunction put Michelangelo in the headlines and caused a rush on products from antivirus software companies, many of whom conveniently volunteered executives as news sources on the dangers of Michelangelo. S&S confirmed three 1995 attacks by the virus, which destroys portions of a hard drive when a PC is booted from an infected diskette. Another company, Symantec, said its 52 confirmed attacks in '96 were about the same as last year's number.

"Michelangelo is clearly a diminishing problem," says Dr. Alan Solomon, founder of S&S. "It's a good example of how regular use of good, up-to-date antivirus software reduces the risk."

Dr. Solomon's observation includes good advice with its not-so-subtle plug of antivirus products. Users who regularly download files or share diskettes can save themselves future headaches with faithful use of current antivirus packages, which examine every incoming file for infection. How sure are you that the only Michelangelo in your next download is an image of a painting? ●

The Web Can Wait



Product labels such as “http://drinkinc/soda/zippo.com” may not be as common as company logos in the coming months after all. Though World Wide Web addresses are popping up in ads everywhere (found while watching TV recently: addresses for the NBA, CBS news, a TNT movie, and a Canadian sitcom), many businesses remain unconvinced that they need a public Web presence, or even an Internet connection. This comes as shock to the crowds who believe that executives at every business who is any business lie awake thinking of Internet strategies.

A recent study from O'Reilly & Associates' Online Research Group found the Internet is an “open field” for businesses that want to get online. Translation: Companies may not face as much competition online as they think since many competitors haven't bothered to hook up to the 'Net.

The study found that 53% of medium-sized businesses (101-999 employees) have no Internet connection or plans to acquire one. Don Ulsch, senior vice president of the Online Research Group, says that statistic means there's plenty of room for companies to get on

the Internet. But, he warns, it also means 'Net access is far from universal, even among large companies, making it a challenge to reach a targeted audience.

Furthermore, more of the companies with an Internet presence keep their data behind the counter rather than on the shelves for customers to access. Thirty-five percent of the large companies (more than 1,000 employees) and 20% of the medium companies surveyed have public Web sites. But even more companies (37% of the large and 23% of the medium companies) have an intranet setup, which uses Web technology to distribute information within a company.

The market that 'Net-savvy companies seek is a promising one. An Odyssey Homefront study conducted in January found that 11% of U.S. households are online, with 23% of those homes (or 8% of all households) using the Internet and Web. The demographics of those going online at home are the stuff of marketing dreams. According to a late 1995 Odyssey study, they're relatively wealthy (almost a quarter of the households make more than \$75,000), twice as likely as the overall population to have college degrees, and at the age where disposable income is handy (60% are 35 or older).

But software executive John Evans recently warned colleagues that consumers won't stand for an online world that's a steady product pitch.

“Instead of thrusting advertising down people's throats, we have to get an audience—we have to entertain,” Evans said in a speech reported by *The Wall Street Journal*.

It seems a careful presentation of online content wrapped in ads could turn the 'Net into the gold rush so many hope for. ●

You've Got Personality

Are you kindhearted and generous or mean-spirited and arrogant? The *Personality Test* from Virtual Entertainment might help you “see yourself as others see you.”

This multimedia CD-ROM actually contains four separate subtests to aid you in your metacognitive efforts. Most of the tests involve the taker choosing descriptive adjectives, agreeing or disagreeing with general statements, or selecting activities of interest.

The first of these is the *Personality Test*, which holds a mirror up to your soul. Well, kind of. The test is pretty standard. You apply different adjectives to yourself, ranging from “aggressive” to “well-groomed.” (Unfortunately, it does not include words such as “modest” or “dishonest,” so it's pretty easy to deceive the program.)

The first time we tried it, it seemed fairly accurate, if just a tad generic. But the second time, we failed to choose any adjectives or activities, and the program proceeded to tell us that we were “demanding, determined, disciplined, and decisive” (not bad, for not making any decisions). It also said we “love seafood and dining out.”

The second analytical exam is the *Self-Image Test*, designed to evaluate what you think of yourself. The results were quite

accurate for the second test. The first time, we put in the responses of a kind, confident, mature individual, and the program said we were kind, confident, and mature. The next time, we acted malign and pessimistic, and the program insightfully said we had a “negative self-image.”

The third test, *Well-Being*, is supposed to help test takers determine to what degree they need stimulation and change at this moment or cycle in their life. But the program gives results that look as if they come more from guessing than from examination of the responses. Both times we tried it, the results suggested that we were not content in our lives and needed to confront our areas of stress. It ended up sounding more like a cheap horoscope than a professional analysis.

It did say, if we left a response blank, that our results would not be accurate. The programmers obviously learned as they went along.

The final quiz is the *Destiny Test*, a self-help diagnostic to measure and evaluate your need to manipulate and direct the course of your life. These results made a jump to their conclusion, but it wasn't as large as the one made by *Well-Being*.

Overall, the *Personality Test* was vague and inaccurate but still somewhat insightful and enjoyable to take. Its low list price, \$19.99, is an advantage, since the test has little replay value.

For More Information:

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Virtual Entertainment
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Deciphering DOS Error Messages

From the newest computer user to the wisest DOS guru, no one is exempt. We all find ourselves occasionally stopped in our tracks by cryptic DOS messages. While most messages aren't caused by major failures, they can be frustrating, especially if you don't know what they're trying to tell you. Think of DOS messages as road signs. Some are merely informational, letting you know what's about to happen. Many, however, are caution signs, indicating some kind of problem. These are the infamous ones.

Unfortunately, many of these signs are so confusing that they seem to be in a foreign language. What's more, the user's guides to MS-DOS versions 5.0 and 6.0 don't include the comprehensive list of error messages, causes, and solutions that users of versions 3.0 and 4.0 were given. We'll list the most common DOS error messages and help you resolve the problems they indicate.

NOTE: The wording of some of these error messages may vary slightly from one version of MS-DOS to another, but the meanings are the same. These messages may appear either when you're using DOS alone or when you're using a DOS window in Windows. The meanings of the messages are the same in either situation. We're focusing on the solutions for DOS alone; some solutions may be different if you're running Windows.

ACCESS DENIED



You just tried to change a file that is write-protected, locked, or a read-only file. Write-protected files and diskettes

can be read but not written to unless the write protection is removed. Commercial software is write-protected. A locked file is one that can't be altered in some of the more common ways, such as adding or deleting data, moving the file, or changing the name of the file. A read-only file is one to which the programmer has added a command so that users only can view the information or a file that resides in read-only memory (ROM). In other words, there's a good reason why you aren't being allowed to change the file. DOS may have just stopped you from changing a file necessary for your computer to operate properly, such as Command.com. (Command.com is the command interpreter, or the part of MS-DOS that looks for and carries out your instructions.)

BAD COMMAND OR FILE NAME



DOS didn't recognize the command you just typed or can't find the file you referred to in the command. The most likely problem is that you misspelled either part of the command or the file name. Check what you typed to be sure you haven't made a simple spelling error. Another possibility is that you haven't established the right path to a file. Recheck the location of the file

and be sure to enter the path correctly when you retype the command. Finally, it's possible that the version of DOS you're running doesn't recognize this command. If this is the case, you'll need to see if your version has an equivalent command; check your user's manual or call technical support.

BAD OR MISSING FILE NAME



A command in your Config.sys file is entered incorrectly. You only should get this message if you recently changed something in this file. Go back and check to be sure you typed the recent addition or change correctly.

NOTE: Anytime you make a change to your Config.sys or Autoexec.bat file, you should make a backup copy of the file on diskette prior to making the changes in case you experience any problems once you've altered the file.

FILE CANNOT BE COPIED ONTO ITSELF



This probably means that you forgot to give a destination location for a file you're trying to copy. Type the COPY command again, being sure to include the destination. If you're not sure how to use the COPY command correctly, type

help copy and press ENTER.



FILE CREATION ERROR

This means one of two things: Either you're trying to create a file with the same name as an existing file, or the diskette you're using is write-protected. Check the tab on the diskette to be sure it isn't write-protected. If it isn't, try using a different file name. If neither solution works, try using another diskette with the new file name.

FILE(S) NOT FOUND

Either you typed a file name in a command incorrectly, the file doesn't exist, or the file is in a location other than the one you specified. Check for accuracy and enter the command again.

INCORRECT DOS VERSION

The program you're trying to run has found a version of Command.com other than the one it expected. You probably upgraded DOS versions at some point and now have more than one version of some DOS files on your system, and the program found an older or newer one than it wanted. You may need to re-install DOS to fix this problem.

INSUFFICIENT DISK SPACE

You don't have enough room on your hard drive or diskette to complete the command. Use another diskette or delete some files to make more space available.

INSUFFICIENT MEMORY

Similar to the above message, this one means that you don't have enough memory available to complete the command. If you got this message in response to a DOS command, you are experiencing a shortage of conventional memory (which is the first 640KB of memory). If you were running an application, the message could refer to any kind of memory. Remove any unnecessary **terminate-and-stay-resident** (TSR) programs and try again. (TSRs, also known as memory-resident programs, remain loaded in memory even when they're not running so they can be quickly activated for specific tasks while you're running other applications.)

To free conventional memory, make sure any TSRs you want to keep are loaded into **upper memory** (also called high memory), which is the 384KB of memory between 640KB and one megabyte. To load TSRs into upper memory, your computer must have a 386 or higher CPU and be running MS-DOS 5.0 or newer. You must have Himem.sys and Emm386.exe, two memory managers included with MS-DOS 5.0 and newer, loaded into your Config.sys file to execute the **LOADHIGH** command. Just type **lh** or **loadhigh** before the TSR's command in your Autoexec.bat file. For example, to load the TSR **DOSKEY** into upper memory, you would change the line:

```
c:\dos\doskey
```

in your Autoexec.bat file to read:

```
lh c:\dos\doskey.
```

Again, make a backup copy of the Autoexec.bat file prior to making any changes.

If you're running MS-DOS 6.0 or newer, you can use MemMaker to rearrange files to get the most out of your available memory. Type **memmaker** at the command prompt and follow the on-screen directions.

INVALID DIRECTORY

DOS can't find the directory you specified. Either you typed the directory incorrectly, or it doesn't exist, at least not on the drive you specified. Check your typing and the location of the directory. It may be that it's a subdirectory. To see the subdirectories of a directory, type **dir**. The contents of the drive or directory you're currently in will be displayed; directories and subdirectories will have <DIR> after their names.

INVALID DRIVE IN SEARCH PATH

This probably means that you have made a hardware change and haven't updated the **PATH** command in your Autoexec.bat file to reflect the drives that are now in your computer. Update the command and try again.

INVALID DRIVE SPECIFICATION

DOS can't find the drive you tried to switch to. Either you made a typing error, asking your computer to find a drive that doesn't exist, or the drive you asked for isn't working. If you get this message when trying to switch to your hard drive, it may be in need of repair or replacement.

INVALID FILE NAME

Like the "Invalid directory" message, this means DOS can't find what you're looking for. Check the name and location of the file and try again, being sure to type carefully. (Getting tired of comments about your spelling and typing skills yet? Just wait; DOS will complain again.)

INVALID MEDIA TYPE

This is a fancy way of saying that the diskette you're trying to use is no good. Reformat it or use a different one.

INVALID PARAMETER

You've entered a command **parameter** incorrectly. (A parameter is an instruction you add to the end of a command to tell the command what to operate on. For example, if you type **dir a:**, the "a:" tells DOS that you want a list of the contents of the A: drive, regardless of which drive you're currently in.) Check the format of the command and re-enter it exactly as shown. The other possibility is that you're using a parameter not available in the utility program you're trying to use.

NON-SYSTEM DISK OR DISK ERROR. REPLACE AND STRIKE ANY KEY

Before computers had hard drives, the operating system was stored on a diskette called the system diskette, bootable diskette, or DOS diskette. That diskette was kept in the A: drive, where the computer would look for it when it was started. Even though operating systems are now on the hard drive, most computers still look at the diskette drive before checking the hard drive. If the A: drive is empty, they check the hard drive, usually the C: drive. If they find a nonsystem diskette in the A: drive, you'll get this message. The most common reason for this message is that you left a diskette in the A: drive when you last used it. Remove the diskette from the drive and strike any key to continue.

Another possibility is that you have a computer (probably an old one) that boots from a system diskette. In that case, this message means that you need to put that diskette in the A: drive and continue.

If neither of the above situations applies to you, you may face a more serious scenario. The first step is to get a DOS system diskette and try booting the computer from it. You should get to an A> prompt. Type **c:** and press ENTER. If you get a C> prompt, the drive is running, but your operating system is lost; type **cd dos**, press ENTER, type **sys c:**, and press ENTER again. That should replace the operating system. If, on the other hand, you get a message saying "Invalid drive specification" when you try to switch to the C: drive, your hard drive isn't working properly. You'll need to have it serviced or replaced.

NOT READY READING DRIVE A/ABORT, RETRY, FAIL?



The drive is not reading a diskette in drive A:. Check to be sure the diskette is fully inserted into the drive, label side up, and that the drive door is closed properly. Then press R to retry.

This message also could mean that the diskette you're using is damaged. If the diskette is properly inserted and Retry doesn't work, choose Fail, which will prompt you for a drive to switch to. Choose the C: drive, and you'll be back at the command prompt where you can start over. (The Abort option just cancels the operation.)

OUT OF MEMORY



This means that a program can't complete its task because you don't have enough free memory. Close some of the programs that are running and try again. If there are no other programs running, you may need to add memory to your computer. Before buying more memory chips, however, try a memory manager such as Quarterdeck's QEMM. Memory managers are programs that optimize your memory in a variety of ways, including analyzing memory use and determining a more efficient arrangement of files. Running the MemMaker utility already discussed also may help.

PATH NOT FOUND



A path is the set of directions you give DOS to tell it how to find something. For example, the path C:\DOS\Edit.hlp tells DOS to find the file Edit.hlp in the DOS directory on your C: drive. If you get this message, DOS couldn't find the path you entered. Check what you typed and re-enter the path carefully. If that doesn't work, the path doesn't exist.

SYNTAX ERROR



You've either made a typing error in a long command, or you've used terminology DOS (or at least your DOS version) doesn't recognize. Check what you typed for accuracy. Again.

THIS DISK CANNOT BE UNFORMATTED



Sometimes, if you format a drive or diskette and then realize there was important information on it, you can save the day by using the UNFORMAT command. However, depending upon the type of format you did and whether you've written new data to the location, UNFORMAT may not work, and DOS will tell you so with this message. Try again, on the chance that DOS is just being ornery; if you get the same message, your data's gone to that great disk in the sky. We hope you had a backup copy.

TOO MANY OPEN FILES



Unlike some messages, this one's meaning is clear. You may not realize how many files are actually open. For example, you may have only opened one application, such as a word processor, but that application may have opened several files that are required for the application to run.

Open your Config.sys file and increase the number of files specified in the Files= line. This is the command that determines how many files DOS is allowed to have open at once. If there isn't a Files= line, the number allowed is eight. Add the line, setting the number at 20 or higher. The maximum you can set this number to is 255, but you'll give up more conventional memory as you increase the number allowed. The best solution is to check the documentation for the application that caused the error, find the number it suggests that the Files= line be set to, and set it at that number. If there's a range given, set it at the high end of the range. That should let your program run without sacrificing more conventional memory than necessary.

Once you've made the adjustment, restart your system and try running your program again.

WRITE-PROTECT ERROR



You've tried to format a diskette that is write-protected. Like the "Access denied" message, this one's usually for your own good. You also could be trying to use a diskette from another source, and that source would rather have you keep their software than recycle the diskette.

Other Error Messages

If you encounter an error message that's not included on this list, there are several things you can try. First, if the message happened in response to a command you entered, be sure you have typed the command correctly. As you probably could tell from the list we gave here, the majority of errors are caused by simple mistakes. Second, carefully read the message; most of them usually provide enough information to tell you why they occurred and help you correct the problem.

Third, try DOS' Help features, which will display the correct format of the command that caused the error message. (Help is available in versions 5.0 and newer, and Fasthelp is available in 6.0 and newer.) You can get Fasthelp on some commands by typing **fasthelp** followed by the name of the command that caused the message and pressing ENTER. You also can type the command followed by **/?** to get help with it. Either of these options will display the format of the command, assuming it's supported by Fasthelp. If it isn't, try regular Help, by typing **help** followed by the name of the command and then pressing ENTER.

If all else fails, call Microsoft technical support. (See "Getting The Most Out Of Technical Support" in this issue.)

While DOS error messages are one of the more frustrating aspects of computing, once you know what the most common ones mean and how to fix the problems, they'll be more like speed bumps than roadblocks. ●

by Diana K. McClain

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Installing & Configuring Windows 3.1



Though Windows 95 eventually will dominate the PC market, you still can find Windows 3.1 on many machines. So if your system already has Windows 3.1 loaded, does that mean you can lose the diskettes? Nope.

There are many times when you may need to re-install and reconfigure Windows. One is when you add peripherals, such as a printer, modem, or CD-ROM drive, to your computer. Another is when you want a dual-boot system (for example with Windows 3.1 and Win95). (A dual boot is a configuration that lets a computer be started with one of two operating systems.) But the majority of the time, you'll need your Windows 3.1 diskettes when something goes wrong. If one of your components starts acting funny, it often means a Windows file has been corrupted or erased. Rather than try to track down the cause, technical support representatives will tell you to re-install Windows. That usually takes care of the problem.

Let's go through the installation process and examine its features.

■ Ready With The Diskettes

If you're running Windows 3.1, exit to the DOS prompt. Insert the first diskette, labeled "Disk 1—Setup," in the appropriate drive, normally A:. At the prompt, type `setup` and press ENTER.

The initial screen welcomes you to Windows Setup. Press ENTER to continue.

The next screen asks if you want to do an Express or Custom installation. Since the Express method bypasses some useful steps, we'll do a Custom install. Press C to continue. (See "Basic Training" in this issue for the steps involved in an Express installation.)

Setup then presents a path, C:\WINDOWS, for your approval. If you already have Win95 or another version of Windows loaded, change the path name. A good choice would be C:\WIN31. Otherwise, accept the default and press ENTER to continue.

Next, Setup displays the hardware components it has detected on your system. To edit an item, use the Up and Down arrows to highlight it. Then press ENTER, and a list of alternatives appears. Click the correct value and press ENTER. When you're satisfied with all the entries, press ENTER.

(NOTE: If any of these screens are missing, something is probably wrong with the setup procedure. Exit Setup by pressing F3 and refer to the troubleshooting section of the manual.)

The routine continues by asking for diskettes 2 and 3. Insert each diskette when requested and press ENTER to continue. This copies the basic Windows files to your hard drive.

A dialog box appears soliciting your name and company. Setup stores this information in a file so Windows programs can identify you. Type the proper answers in the blanks. If you don't have a company, you can put your occupation or leave it empty.

Then click the Continue button or press ENTER. Another box has you verify the information you just entered. You can modify your responses or accept them as is. *(NOTE: If you want to change them later, you'll have to run Setup again.)*

Next, a box asks if you want to set up Windows components, printers, and applications already on the hard drive. The three items are checked. If you only want to establish a new printer, for instance, uncheck the other two items and leave Printers marked. (We'll go through all three parts to show you what to expect.)

The following screen presents a list of five kinds of Windows files: readme, accessories, games, screen savers, and wallpapers and

miscellaneous. Each has a Files button next to it. Each item is checked, so if you want all these files, simply click Continue. But let's see how to customize the file sets in case you don't want all of them on your system.

■ Customizing Your Files

Click the button next to screen savers. A window with two boxes appears. The left-hand box displays the files not to install and is blank. The right-hand box displays the files to install and shows four entries.

Let's say you want only the stars screen saver. Click the other three, and Setup highlights each in blue. Then click the Remove button between the two boxes. This moves the three selected files to the Do Not Install box.

Similarly, you can highlight entries in the Do Not Install box and move them to the Install side by clicking the Add button. You have complete control over which files to include. Installing all of the files is the easiest approach, but if space is tight, you may want to omit some. You can do without these files, but you should keep the ones you think you'll use. Go ahead and customize the five sets of files. When you're done, click OK to continue.

The next box reports if Setup has detected a permanent swap file on your hard drive. Windows uses the swap file when too much is going on in the PC's random-access memory (RAM), and it has to store the excess on your hard drive. The swap file substitutes for RAM, which is why it's called virtual memory. (RAM is the temporary memory storage area where program instructions and files currently being used are kept. Information in RAM is lost when the computer is shut off unless the information is permanently stored on your hard drive or a diskette.)

This virtual memory screen occurs if you're re-installing Windows or loading it over an earlier version, which is probably the case. Click Yes to delete the existing swap file, and Setup will create a new one. Or click No if you adjusted the swap file previously and are satisfied with its dimensions.

Setup now suggests the drive, size, and type of virtual memory it thinks you require. If you know what you're doing, you can click Change to modify these values. If not, accept the defaults and click Continue.

Setup now copies the Windows files you selected, prompting you to insert diskettes 4 and 5. Follow the instructions to proceed.

Next, a box describes the process of modifying your Config.sys and Autoexec.bat files. It tells you that Setup can make all the modifications for you, let you review and edit the changes, or let you make the modifications later. Normally, you can let Setup make the changes, but let's see what happens if you review and edit them now.

Pick the second option and continue. Two boxes appear. They show your old Autoexec.bat on the bottom and the new Autoexec.bat on top. Each is in a small edit window, so you can compare the two versions and alter the proposed changes to your liking. Again, you shouldn't do this unless you feel confident about it, but it's nice to have a choice.

Click OK, and Setup displays another pair of boxes with your old and new Config.sys files. Again, you can make changes or accept the defaults. When you click Continue, Setup saves your old files as Config.old and Autoexec.old. (If Config.old and Autoexec.old already exist, Setup will label the backups Config.000 and Autoexec.000 instead.)

■ Installing A Printer

The next screen involves printers. It has three boxes: the default printer, installed printers, and a list of printers. The first two should be blank.

To install a printer, scroll through the printer list at the bottom until you find your model. Highlight it and click the Install button to the right. Setup now prompts you to insert diskette 6, which contains the printer driver (a file that tells your computer how the printer works). Setup copies the driver to your C: drive. The printer you selected now shows in the default and installed printer boxes.

If you have more than one printer or a related output device such as a plotter, continue by doing more installations. If you want one of the additional devices to be the default, highlight it and click the button in the Installed Printers box. This designates it as the primary printer.

When you're done with printers, click Continue. Now Setup creates your Program Manager window (your starting point in Windows 3.1). It adds icons for your Main, Accessories, Games, and Startup groups and populates each of them with programs.

Next, Setup offers to set up your applications. A box says it will search either your path or the entire hard drive for them. Unless you're familiar with all your PC's software, choose the default, Path, and click Search Now.

Setup searches the specified location for files. If it finds one with an extension of .EXE or .COM, it adds it to its list. Sometimes Setup will recognize an application's name, but if it doesn't, it tells you it needs a name and supplies suggestions. You can accept one of these names or pick None Of The Above.

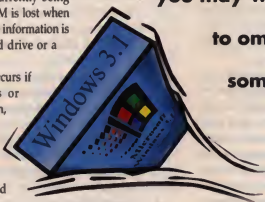
After a thorough scan, Setup presents two boxes. One has the applications it found on the drive, and the other has the ones you want Windows to set up. As you did when customizing Windows' files, use the Add and Remove buttons in the middle to move files back and forth.

When you have the applications you want to set up, click OK. Setup creates an Applications group in Program Manager and icons for each program within it.

You're just about done. The penultimate box lets you either run or skip a Windows tutorial. Then an exit box asks if you want to reboot your PC now or return to DOS. Rebooting is necessary for the system to carry out all the changes you made. Click Reboot unless you want to work in DOS. The computer reinitializes itself, goes through its system checks, and launches Windows 3.1. ●

by Rob Schmidt

Installing all
of the files is
the easiest approach,
but if space is tight,
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some.



Basic Training

Regardless of the operating system you choose, there are a few elementary functions you should understand. This monthly section is your one-stop guide to learning these crucial first steps in DOS, OS/2 Warp, Windows 3.1, and Windows 95. Use it to learn your operating system and see whether others offer a smarter way to work.

Installing An Operating System

You can't start working in your operating system of choice until it's been installed on your system, a process that can present an array of challenges. This month, we tackle very basic training, installing each of the four main operating systems (OSes) on empty computers. Note that we did not upgrade from earlier versions of each OS. DOS, Windows 95, and OS/2 all have separate versions of the software for users who are upgrading from a previous version and for users installing the operating system for the first time. Windows 3.x requires DOS 3.3 or newer. Make sure you have the right version for your situation before you begin the installation. Otherwise, you'll get a message early in the installation process telling you that you have the wrong version and recommending that you exit the setup program and get the correct version.

You may be wondering when you would need to install an operating system to begin with. After all, if you buy a computer these days, it usually comes with the operating system pre-installed. There are a few exceptions, however.

If you buy a used computer, there are two possibilities. First, it may have an older version of an operating system on it, which you will want to replace. It's also possible that the computer will come to you with a newly formatted hard drive and no operating system or software at all. In fact, this is probably what should happen if you get a used computer, as the software was licensed to the previous owner and not to you. Unless the person you bought the computer from transferred ownership to you, keeping no copies, the licensing agreement for that software has been violated. Besides, if you get the computer with the operating system already installed, but no diskettes, you'll run into problems if you need to change anything about the OS. Remember also that you won't have a backup in case your system crashes.

The other situation in which you would need to install an operating system from scratch would be if you reformatted your hard drive. You might do that, for example, if your hard drive was having a lot of problems. (For more information on formatting your hard drive, see "Cleaning Disks With FORMAT" in the April 1996 issue of PC Novice.)

■ MS-DOS

To install MS-DOS 6.22 (the latest MS-DOS available) on a computer without a previous

version of DOS, insert Setup Disk 1 into your A: drive and start (or restart) the computer with your monitor turned on. The first thing you'll see is a system check, during which various elements of the computer system are reviewed for errors. If there aren't any errors, you'll see a message at the top of your screen that says "Starting MS-DOS." After that message, Setup starts. You're given three options: exiting Setup without installing DOS by pressing F3, pressing F1 for more information about Setup prior to installing DOS, or proceeding with Setup. Press ENTER to continue with Setup.

Verifying settings. Next, you'll be asked to verify the Date/Time, Country, and Keyboard Layout settings. If the settings are correct, press ENTER to continue. If any of them are incorrect, use the Up and Down arrows to select the incorrect setting and press ENTER to be allowed to change it. Once you've corrected the setting, press ENTER again to confirm it. When all of the settings are correct, press ENTER to continue Setup.

Selecting a directory. You'll now select a directory for DOS to be installed in. The default directory (the one chosen by Setup) is C:\DOS. Press ENTER to accept this as the directory for DOS.

File transfer. Wait while the files are transferred from the installation diskettes to your hard drive. You'll be prompted to remove each diskette when it's done, insert the next diskette into your A: drive, and press ENTER to continue. While the files are loading, a status bar across the bottom of your screen will tell you what percentage of the transfer is complete, and you'll see information on when and how to use DOS utilities such as DriveSpace, MemMaker, and ScanDisk. You'll also be prompted to fill out and send in your registration card to register your copy of the software.

Each of the three installation diskettes will take about two or three minutes to load. When the installation process is complete, you'll be instructed to remove the diskettes from all of the drives and press ENTER. You'll get a "Setup Complete" message; press ENTER to restart your computer. When your computer restarts, after the system check, you should get a message that says "Starting MS-DOS," and then you'll get a C> prompt. You're now ready to go!





■ OS/2 Warp Connect

Before you begin installing OS/2 Warp Connect (an OS/2 version that includes connectivity features), make sure that your CD-ROM drive is compatible with OS/2. If it isn't, you'll need to download a new device driver. This may sound easy, but it took our staff hours of extra work, several calls to technical support personnel, and a lot of frustration to finally get the installation to work properly with our CD-ROM drive, which wasn't OS/2 compatible. We recommend that you call IBM or your CD-ROM drive's manufacturer to check compatibility between OS/2 and your CD-ROM drive before beginning—or better yet, before deciding upon the operating system. For this how-to, we'll assume that you have a compatible drive and leave out the extra steps because they vary depending upon what kind of drive you have if it isn't compatible.

Insert the OS/2 Installation CD-ROM and the Installation Disk For CD-ROM into the appropriate drives. Turn on (or restart) your computer. OS/2 will boot from the diskette, and you'll be prompted to remove the Installation Disk For CD-ROM, replace it with Disk 1, and press ENTER. You'll see the OS/2 Warp title screen and then a screen bearing the message, "Loading, please wait. . .".

Next, you'll see a Welcome screen. Read the information presented here and press ENTER when you're done.

Installation options. The following screen offers two choices of installation types. The default setting is the Easy Installation, which most users should choose. Press ENTER to continue with this type. You'll again see a message asking you to wait while files are loaded. A status bar shows how much of the transfer is complete, and information about OS/2 is displayed for you to read while you wait. After the files are copied, OS/2 checks your system's configuration. When it's done, you'll be prompted to remove the diskette from your A: drive and restart the computer by pressing ENTER. Leave the CD-ROM in the drive.

Verifying settings. When the computer restarts, you'll see the usual system check, then the OS/2 Warp title screen. After this, the System Configuration screen will appear. Check that the information is correct. If anything needs to be changed, such as the country settings, left-click the icon next to the incorrect information, change it, and left-click OK. If everything's right, left-click OK to continue.

Next, you'll see the Select System Default Printer screen. Use the arrow keys to highlight the name of your printer. If you don't have one, leave Do Not Install Default Printer highlighted. If you're installing a printer, left-click the circle in front of the port your printer is connected to. When you've chosen your printer settings, left-click OK to continue.

Now you'll verify the multimedia device settings; make sure everything is accurate and left-click OK to continue.

Network features. The final decision you must make is whether to use the Networking Support features of OS/2 Warp Connect. (Earlier versions of Warp don't offer this

feature.) If you choose Yes, follow the directions to select the features you want set up. If you aren't connected to a network, choose No and left-click OK to continue. (We completed our installation without installing the network support features, as the computer we used was not connected to our office network.)

File transfer. You'll see a series of messages letting you know that OS/2 is alternately transferring files and updating your system configuration. After several rounds of these messages, you'll reach a screen saying that setup is complete and that you need to shut down and restart your computer for the settings to take effect. Select OK to shut down the system. You'll then get a message saying it's safe to shut down the system or restart it by pressing CTRL-ALT-DEL. Use that key combination to restart your system. OS/2 will load and take you to the Tutorial; you either can go through it now, or you can skip it by pressing F3 or left-clicking Quit to get to the OS/2 desktop.



■ Windows 3.1

Windows 3.1 requires DOS 3.3 or newer; we installed Windows on a computer on which we had installed DOS 6.22 by following the instructions above.

To begin the Windows installation process, insert Disk 1—Setup in drive A:, type `a:\setup`, and press ENTER. This will run the Windows Setup program. The first screen in Setup will prompt you to press ENTER to continue, F1 to get more information, or F3 to quit Setup. Press ENTER.

Setup options. Next, you'll choose between an Express setup and a Custom setup. Most users should choose the Express setup. Press ENTER for this option. (If you want to perform a Custom installation, see the article "Installing & Configuring Windows 3.1" in this issue.)

File transfer. Setup then will check your configuration information and copy files to your hard drive. You'll be prompted to remove each diskette as Setup finishes with it, insert the next diskette, and press ENTER. Each of the first three diskettes took between one to two minutes to load.

Making it yours. During Disk 3, you'll be asked to enter your name and your company name if you're using Windows for business purposes. Type in the information, using the TAB key to get from the name line to the company name line, and press ENTER. Setup will display what you entered, giving you a chance to correct it if you made an error. If you need to make a change, click Change, edit the information, and press ENTER. If the information is correct, press ENTER or click Continue.

Printer installation. Setup then will continue copying files; you'll again be asked to change diskettes every few minutes. During Disk 5, you'll reach a Printer Installation screen. Use the arrow keys to select the name of your printer. If you don't have a printer connected to your computer, leave the default option, No Printer Attached, highlighted. Press ENTER when you've highlighted your choice.

Finishing touches. Next, Setup will prompt you to enter an application name for C:\DOS\Edit.com; the default choice is MS-DOS Editor. Press ENTER or click OK to accept that choice.

You'll then be offered the chance to go through a tutorial. You either can run it now or skip it; you'll be able to run it later if you want.

The last step is to exit Setup. You'll be instructed to remove the diskettes from all drives and restart your computer by clicking the Reboot icon or pressing ENTER. When the computer restarts, you'll see the system check and the "Starting MS-DOS" message. You'll then get a C> prompt. To start Windows, type win and press ENTER.



■ Windows 95

To begin the Win95 installation, insert the Boot Disk in drive A: while your computer is turned off. After inserting the diskette, turn on the computer. You'll see a message saying, "Starting Windows 95..." and then the Setup screen will appear. Press ENTER to begin Setup, F1 for more information before proceeding, or F3 to quit.

After Setup starts, you'll be prompted to switch to Disk 1; left-click OK or press ENTER when you've inserted it. Setup then asks you to press ENTER to begin a routine check of your system.

After checking your system, Setup initializes and tells you the setup process will take between 30 minutes and an hour. Left-click Continue to proceed with the installation. Setup then prepares the Setup Wizard to guide you through the setup and asks you to switch to Disk 2.

Next, a license agreement appears; read it and then left-click Yes to accept the terms. (Your only other choice is to not use the software.)

Setup options. The Setup Wizard then takes over, telling you what will happen during installation. Left-click Next to continue. You'll be asked to designate a directory for Win95 to be installed in. Use the default directory, C:\WINDOWS. Left-click Next to continue. Setup prepares the directory and checks your available hard drive space.

Next, you get to choose from several installation options: Typical, Portable, Compact, and Custom. Most users should choose Typical, the default option. Press ENTER or left-click Next to continue.

Identification, please. Now you'll enter your user information. Type your name and, if you're installing Win95 for business use, your company's name, and left-click Next. You'll then enter the 10-digit key identification number from the Certificate of Authenticity included with your copy of Win95 and left-click Next again.

Setup then will give you a Product Identification Number. Write this number down and keep it handy for future reference. You'll need it if you have to call technical support.

Hardware options. Setup then opens a window called Analyzing Your Computer, in which it checks to see if you

have a CD-ROM drive; network adapter; or sound, MIDI, or video capture card. If you do, left-click the box in front of the item(s) you have. Left-click Next to continue.

Communication options. The next window to appear is Getting Connected. This window lets you choose which communications elements you want installed: The Microsoft Network (MSN), Microsoft Mail, and/or Microsoft Fax. Left-click the box in front of any you want. (MSN and MS Fax require modems; MS Mail requires a network connection to a Mail server.) Left-click Next when you're finished.

Choosing components. Now you get to choose which Windows components you want installed on your system. (Any you don't install now can be added through the Control Panel later.) You either can choose the default option and install the most common components or choose those you want from a list. For now, just choose the default option and left-click Next.

Making a startup diskette. You'll be asked next if you want to create a Startup Disk in case you have problems with your system. If you don't do it now, we recommend that you do it soon. Choose Yes or No and left-click Next.

File transfer. Windows then asks you to left-click Next again to start copying files. While the files are copied to your hard drive, information about Win95 features will be displayed. You'll periodically be asked to change diskettes. After the last diskette—Disk 13—has been copied, you'll be prompted to remove the diskette and left-click Finish to restart your computer.

Confirming settings. When Win95 starts after you reboot, it will set up features, telling you what it's setting up as it goes. After that, the Date/Time Properties window will open. Left-click the arrow at the right of the drop-down list for time zones and left-click your zone. Left-click Apply, then left-click the tab for Date & Time. Adjust the date and/or time if it's not correct and left-click Apply if you've made changes. Left-click OK when all of the information is correct.

Printer setup. Your last step is to set up your printer. The Add Printer Wizard opens; left-click Next to continue. Use the arrow buttons to find the manufacturer and model of your printer and left-click them. Then left-click Next and the appropriate port. Left-click Next again and type the name of the printer if it isn't already in the box. Left-click Next one more time and choose whether you want a test page printed after printer installation. Then left-click Finish. If your printer came with an installation diskette, left-click Have Disk and follow the instructions. If you don't have a printer connected to your computer, left-click Cancel.

After you finish installing your printer, Setup finalizes the settings you've entered, and you're done. You'll see a "Welcome To Windows 95" screen. Left-click What's New for information about Win95, Online Registration to register your software via modem, or Close to close the Welcome screen if you want to go right to work. ●

by Diana K. McLean



Utilities Patch Windows 95 Faults

Windows 95 leaps beyond the capabilities of Windows 3.x, but anyone who uses Microsoft's latest operating system knows it isn't perfect.

Third-party software makers jumped on this fact immediately after Win95's release. The program's every defect, be it major, minor, or imagined, supposedly can be solved with add-on utility software, which is designed to fix a particular problem that's usually related to system management. Each product claims no PC is complete without that program's own extra-special abilities. Depending upon how a computer is used, some of these utility programs really are necessary. Others provide more of a psychological effect or perhaps no useful new effect at all.

Use the following summary of leading packages from a variety of utility categories to help you determine which utilities could be useful add-ons to your Win95 system. Users with an Internet connection can download free evaluation versions of most of these packages, so check the Web sites listed with each company name at the end of this article. Evaluation software is the best no-risk way

to decide if a program is right for a particular situation.

■ Backup Utilities

Backup programs make copies of important files to other storage media for safekeeping. If only a few files require backing up, it is a simple matter to copy them to a diskette and be done with it. For users who need to save multiple folders or entire hard drives, a backup program can help by automating the process.

Win95 includes a rather simple backup program found in the Start menu under Programs, Accessories, System Tools. This is adequate for infrequent backups, but it doesn't have the ability to automatically back up files according to a user-defined schedule. Win95's built-in backup also lacks support for magnetic tape backup formats other than QIC-40, QIC-80, and QIC-3010. The popular Travan, DAT, and QIC-Wide tapes were left out in the rush to drive Win95 to market. For users who want to back up more than a few files or folders, Win95's feature isn't good enough.

- Colorado Memory Systems' *Colorado Backup* for Win95 supports most tape drives, including SCSI, IDE, QIC, and parallel port models. Colorado wrote Win95's backup applet, and this full-featured version adds needed capabilities to the existing interface. It is free for the download at the company Web site, or Colorado will sell a manual and the software on a diskette for \$25.
- *NovaBack* by NovaStor (\$141) supports more than 300 different tape drives. Features include NovaBoot, a single-boot-diskette recovery system that reboots a failed computer and automatically begins restoring files from a backup drive.
- McAfee's \$50 *FileStor* is designed for the beginning user and works with most SCSI tape drives. Like most backup products, it includes a scheduler for automatic backups.
- Arcadia Software's *Arcadia Backup* for Win95 (\$63) is guaranteed to work with any tape

drive. Plug-and-play installation lets users plug in their tape drives and start Arcadia to configure everything.

■ Disk Maintenance

If the CPU is the brain of a computer, the hard drive is the stomach. Nearly all of the programs and data files used by the computer reside in that complicated little component, which is the object of many utility programs designed to test, reorganize, and repair.

Win95 comes with a few disk utilities, the two most important of which can be found in the Start menu's Programs, Accessories, System Tools folder. Many computer users regularly run ScanDisk, a utility that checks hard drives for errors. Disk Defragmenter finds scattered bits of files from around a drive and packs them together again, clearing up large areas for new uses.

One of the oldest and most famous third-party disk-tuning packages is *Norton Utilities*. This \$119 application is actually a suite of small programs, each designed for certain tasks. Along with various disk utilities, it offers a System Information application useful for diag-

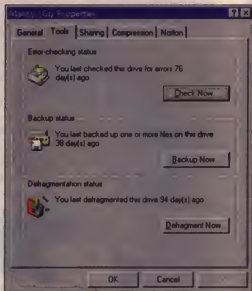
nosizing system problems, a program to make a "rescue disk" for emergencies, and a cleaning program that tracks down unneeded files.

■ Disk Compression

Many users find that their hard drives are too small to hold all of their software and data files. The best, but most expensive, solution is to buy a larger drive. Failing that, Win95 includes a compression program called DriveSpace. Compression programs reduce the space a file requires by replacing repetitive information with "tokens" that represent the information. A shortcut to begin DriveSpace can be found in the Start menu's Programs, Accessories, System Tools folder.

Disk compression programs once were a risky business; a tiny glitch could wipe out an entire drive of data in one crash.

DriveSpace is more advanced than that, although it is always a good idea to back up important files before using compression utilities. One drawback common to all disk compression programs is that they sacrifice



Right-click any disk, and choose Properties to find Windows 95's built-in disk utilities.

speed for space. Though a hard drive may seem to double in size, some systems might slow down a bit. Users may want to experiment with compressing and decompressing their drives, but to be on the safe side, make

Build Your Own Desktop

One of the main duties of an operating system like Windows 95 is to provide tools for file management, which is the copying, deleting, moving, finding, and cataloging of files. Win95's Explorer fulfills many of these requirements in one application, but many of the features are scattered around the operating system. The Start menu on the Taskbar, the pop-up menus that appear when the right mouse button is clicked on a file or folder, and the Recycle Bin all are examples of file management capabilities built into Win95 itself.

Windows 3.x's file management utilities, by comparison, leave much to be desired. Piles of products designed to address these deficiencies sold well. With the advent of Win95, new versions of these utilities hit the marketplace. However, their mission isn't as clear anymore. Win95 already provides most of the tools the average user needs.

We tested three of the leading file management/desktop enhancement utilities for



Dashboard offers a floating toolbox of icons that can be customized for users' tastes.

Win95: Symantec's *Norton Navigator*, Microhelp's *PowerDesk*, and Starfish Software's *Dashboard 95*. With each program, we noted the features available, price, usability, and the most important question: Is this really necessary?

Norton Navigator. Along with a variety of small improvements, the \$95 Navigator tosses in a couple of major additions to the Win95 interface: a special Taskbar and an improved File Manager. With the Norton Taskbar, users can place icons to launch their favorite programs on Win95's Taskbar for easy reach. Special buttons let the user toggle between

multiple desktops, providing (on a fast computer) a quick way to close down one set of windows and open another set.

The Norton File Manager works much like Win95's Explorer. Along with the standard features, it can zip and unzip files, check to see if two files or folders are exact matches of one another, and provide access to a DOS command prompt. The niftiest trick is the way it handles FTP (File-Transfer Protocol) sites as if they were folders on the Desktop. Uploading and downloading from the Internet's FTP sites is as simple as dragging and dropping files.

Navigator offers a range of utilities that work

sure you have copies of all programs on diskette or CD-ROM, and back up needed data before starting.

The *Microsoft Plus! Companion* for Win95 (\$49) includes DriveSpace3, a slightly improved version of DriveSpace. DriveSpace3 lets users fine-tune a compressed drive to strike the desired balance between space and speed.

■ Antivirus Software

Antivirus utilities are some of the most important programs a computer owner can obtain. A growing list of viruses inhabits the world of PCs whether we like it or not, and the best offense is a good defense. Virus vulnerability depends entirely upon how often a user trades files either online, over a network, or with diskettes. Files downloaded from official corporate Web sites are unlikely to include viruses, but downloading programs from newsgroups or accepting diskettes from other users is asking for trouble. Even if the diskette comes from a friend, you may not know where your friend's computer has been.

- McAfee says its \$50 *VirusScan for Windows* 95 detects 96% of 5,000 or so known viruses. VirusScan programs are used by 20,000 organizations worldwide.
- Dr. Solomon's *Anti-Virus Toolkit* (\$118) is a pricey package with a reputation for being the most comprehensive utility around.
- *PC-cillin 95* (\$46) by Trend Micro Inc. features dynamic scanning that increases during risky operations, such as downloads, and decreases for safe operations, such as word processing.
- *Norton AntiVirus* (\$77) is a full-featured program that can run in the background to automatically scan files as they are used.
- *F-Pro*, a DOS-based program that does a good job of catching and removing the latest viruses, is available for free downloading at the following Web site: <http://risc.ua.edu/pub/ibm-antivirus/fp221.zip>. Although the price is right, F-Pro cannot scan files in the background like Win95-based programs. A corporation shouldn't rely on this freeware, but it might be useful for the home.

■ Uninstallers

One of the problems that plagued Windows 3.x was what to do with unneeded software cluttering the hard drive. Applications often install .INI, .DLL, or other files in several locations around the drive, making it difficult to get rid of every component in the event of an uninstall. These components can later haunt users by causing system problems. Programs designed for Win95 usually include a built-in uninstall feature that can be accessed through Control Panel's Add/Remove programs area, but old Windows 3.x applications, most shareware, and other applications need another program for this task.

- Quarterdeck's *CleanSweep* (\$28) provides an intuitive interface, but its need to read the entire hard drive's directory structure every time it is run can make it slow to start. An install monitor detects new programs for easier uninstalling.
- *MicroHelp's Uninstaller* (\$36) loaded up faster each time than CleanSweep, but it operated more slowly on our computer. Like CleanSweep, Uninstaller is easy to use and includes an install monitor.

best on Pentium-based machines with a good supply of RAM. It goes beyond the needs of most users but can be a powerful tool for more advanced computer owners.

PowerDesk. PowerDesk reminded us of a scaled-down version of Navigator. Icons and multiple desktop buttons can be placed on the Taskbar as with Norton, or a floating toolbox can be configured with clocks, gauges, or whatever else the user desires.

PowerDesk's most useful feature is the ExplorerPlus replacement for Win95's Explorer file manager. ExplorerPlus includes all of the features of Explorer but adds a built-in QuickView pane for reading files without opening their related application. Drive-letter buttons such as those in Win3.x File Manager line the top of the ExplorerPlus window for quick switching between disks. The application also sports the ability to zip, unzip, and view archive files.

This zipping feature and the multiple desktops are PowerDesk's handiest features, but we aren't sure they alone warrant the \$39

price. After all, Microsoft's TrayIcon PowerToy (see main article) lets us put icons on the Taskbar for free, and multiple desktops don't work well without a healthy amount of RAM.

Dashboard 95. Those who used Dashboard on their Win3.x computer also will feel right at home with the \$48 Win95 version because the two are quite similar.

Dashboard provides a launchpad-style box filled with user-configurable information such as a calendar, memory gauges, and printer selectors. As with the other products we tried, Dashboard offers multiple desktop buttons,



Navigator's File Manager is like a souped-up version of Windows 95's Explorer.

icons to launch specific programs, and tabs to open program groups. Dashboard is flexible, and a lot of information can be crammed in its little box.

Aside from the multiple screen capability, however, Dashboard does little that we couldn't do before. The program was a great tool for organizing Win3.x, but Win95 doesn't suffer from Win3.x's lack of a real interface. The extra toolbox floating around took up unnecessary desktop space while duplicating many elements of Win95's Taskbar and Start menu. ○

- **Remove-It** (\$35) by Vertisoft includes a database of 1,000 applications to assist in removing previously installed programs.

■ File Compression

File compression tools differ from disk compression programs in that they squeeze down individual files rather than entire drives. Compression is a good way to fit large files onto 1.44MB diskettes or shorten upload and download times by making files smaller. Many downloaded files are compressed in ZIP format, a widespread standard for PCs. Such files are denoted by the .ZIP file extension. In order to use a compressed file, it must first be decompressed. Win95 does not include a way to decompress ZIP files, making an add-on utility of this sort a requirement for those who download files.

- **Niko Mak Computing's WinZip** is one of the most popular Win95 compression/decompression applications. Evaluation versions are free on the Web. Registration costs \$29. WinZip also offers add-ons to the basic program such as the WinZip self-extractor, which allows the creation of files that unzip themselves.
- **Zip Explorer Pro** by AeCo Systems is designed to imitate the same interface used by Win95's Explorer. At \$40, it is more expensive than WinZip, but it offers a superior interface.
- **Vertisoft's Zip-It** (\$38) includes a built-in viewer for investigating the contents of archives before unzipping them.

■ Tweaks

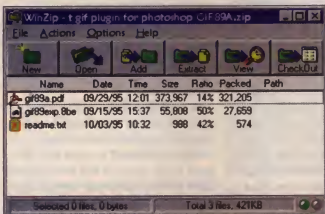
Some of the most useful utilities we've encountered are the free PowerToys available direct from Microsoft at its Web site at <http://www.microsoft.com/>. These small applets each do a specific job such as adding commands to the right-mouse-click menus or letting users launch their favorite applications from icons on the Taskbar. Tweak UI is a long-awaited Control Panel add-on that lets users fine-tune several Win95 characteristics.

The best thing about the PowerToys is, of course, that they cost nothing. Microsoft can afford to give them away because it makes its money elsewhere. But most software companies must convince consumers that their utility applications are the best computer development since vacuum tubes.

Before buying one, make sure Win95 doesn't already have the necessary tools. The operating system's own disk compression, backup, repair, and file managing features may not be as full-bodied as some third-party add-ons, but they get the job done for

most users. Just like Win95 itself, no utility is perfect. ●

by Alan Phelps



WinZip makes it easy to compress and decompress .ZIP archive files.

For More Information:

AeCo Systems

(800) 239-5140
(415) 221-7806
<http://www.creative.net/~aeCo/>

Arcada Software Inc. (Seagate Software)

(800) 327-2232
(407) 333-7500
<http://www.arcada.com>

Colorado Memory Systems

(800) 416-8596
(970) 635-1500
<http://www.hp.com/isgsupport/cms/00index.html>

McAfee

(888) 847-8766
(408) 988-3832
<http://www.mcafee.com/>

MicroHelp

(800) 922-3383
(770) 516-0899
<http://www.microhelp.com/>

Niko Mak Computing, Inc.

(800) 242-4775
(713) 524-6394
<http://www.winzip.com/>

NovaStor Corp.

(800) 668-2786
(805) 579-6700
<http://www.novastor.com/>

Quarterdeck

(800) 683-6696
(813) 523-9700
<http://www.qdeck.com>

S&S Software International Inc.

(800) 701-9648
(617) 273-7400
<http://www.sands.com/>

Starfish Software

(800) 765-7839
(408) 461-5800
<http://www.starfishsoftware.com/>

Symantec

(800) 441-7234
(541) 334-6054
<http://www.symantec.com/>

Trend Micro Inc.

(800) 531-0450
(714) 969-7746
<http://www.antivirus.com/>

Vertisoft

(800) 466-5875
(803) 269-5311
<http://www.vertisoftsys.com>

NEWS

MULTIMEDIA

ACCESSORIES

Allsop, Inc. Computer Accessories continues to provide products which address the rapidly expanding needs of multimedia computer users.

Multimedia PC's have taken over the marketplace with advantages over their standard PC counterparts such as larger monitors, high quality graphics and larger memory systems. With all the buzz around this category have also come changes in software and accessories. Allsop, is proud to introduce 3 new innovative products that will help you maintain your own multimedia system as your needs change.

The advances in software have generated a need to organize and store a wide array of media types including CD-ROM, 3.5" Diskettes and "Zip" Disks. The Allsop Multimedia VersaTile



incorporates an innovative design that can accommodate all this and more.

The VersaTile comes with two removable multi-use files which can be used in the tile or as a smaller stand-alone file. In a multiple worker environment, each user can orient half of the unit toward their workstation. Upon removal of the 2 files, the frame can be used as a flip file for up to 20 in-case CD's. With it's specialized slot design; the VersaTile allows for storage of up to (36) CD-ROM or Audio CD's, (20) "Zip" disks, (36) 3.5" Diskettes and (36) PC Cards along with the extra capacity of the flip file frame. The VersaTile's alternative layout options give you the ability to change storage configurations for fingertip access to your most used media titles. The full range of the VersaTile is best suited to

the computer environment that requires easy desktop access and placement of multiple media types. Available at most computer and software retailers, the Allsop Multimedia VersaTile has a suggested retail price of \$14.95.

As Software programs continue to flood the marketplace, consumers are faced with the problem of protecting their valuable CD-ROM collections. It is estimated that 1 in 7 CD cases in your collection will be cracked or broken during normal use, endangering the contents and often resulting in costly replacement. Allsop solves this problem with their introduction of the "Strong Box" unbreakable jewel case. The new "Strong Box" protects valuable CD-ROM and Audio CD's from damage caused by impact or direct pressure on the jewel case. The "Strong Box" is manufactured with TFB 211, a flexible plastic which offers optimum characteristics for both impact resistance and flex strength. The "Strong Box" also features an internal, reverse memory hub system that secures the CD-ROM in place, allowing the delicate data surface to remain untouched inside the case. This case also protects against damage caused by dust and other air-borne contaminants.

Available in 5 packs, Allsop "Strong Box" jewel cases can be found in most computer stores with a suggested retail price of \$8.95.



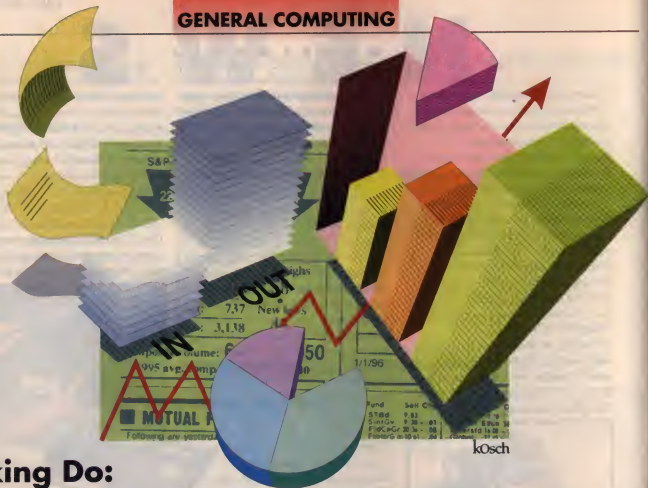
Allsop has also taken multimedia storage to the popular "transportable" market. Among the large section of multimedia users, Allsop has heard many requests for a transportable piece that can accommodate the growing multimedia

offerings. Many of the requests have come from users that work as designers, graphic artists or desktop publishers. In response to this need Allsop presents the Media Traveler; a lightweight transportable wallet that can accommodate up to: (4) CD-ROM and Audio CD's, (12) 3.5" Diskettes, (8) "Zip" Disks, (4) "EZ" Cartridges, & (4) 3.5" Twin Pack files. The Media Traveler provides compact, protective storage for occasional trips to the printer or to meet



with clients. The lightweight portable design easily fits into a purse, backpack or briefcase. Constructed of moisture resistant Cordura nylon, the Media Traveler also features a full length Velcro closure system, combination business card & pen holder and seamless pockets to prevent shutter snagging. Available in Black, Raspberry, Teal and Grape. The Media Traveler has a suggested retail price of \$11.95.

Allsop, Inc. has a well founded reputation as a quality leader in the computer accessories industry. Based on it's innovative designs and careful craftsmanship; Allsop has continued to create products that stand the test of time. A 30 year tradition of meeting the needs of their customers has earned this Bellingham, Washington company a large following of loyal customers. Additional information on these and other innovative Allsop products can be found on the Allsop Internet Home Page at <http://www.allsop.com/info> or by calling their toll free number at (800) 426-4303.



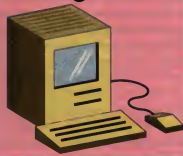
Making Do:

Improve PC Productivity Without Spending A Dime

Sometimes it seems as if the only thing that doesn't cost money in the computer world is advice on how to spend it. You need more storage? Get a bigger hard drive. You want faster memory? Purchase some RAM. Processing speed too slow? Buy a new computer. Since the birth of electronic data processing, the panacea for computer deficiencies has been cold, hard cash.

Not all computer problems require such costly treatment, though. Many can be alleviated, eliminated, or prevented through strategic computing methods or by using the tools contained within the DOS and Windows operating systems. None of these tips requires extensive computer training or programming expertise. The trick is simply knowing they exist.

Maximizing Memory



Make your own mem. The first and most important step for maximizing random-access memory (RAM) in a non-Windows 95 environment is to load DOS into high memory. (High memory is the first 64 kilobytes [KB] of extended memory. See Figure 1.) Loading DOS into high memory frees a large chunk of conventional memory without adversely affecting system performance. (RAM is the temporary memory storage area used to load program instructions and store files currently in use.)

DOS 4.x and newer users should first type **mem** at the C> prompt. A chart will appear, outlining the memory configuration of your computer system. The very last line of the chart should reveal that DOS is already resident in the high memory area. If it isn't yet stored in this area, you'll need to edit your system files to put it there. (NOTE: Always make sure you back up your system files before editing them.) To back up your Config.sys file, insert a diskette into the diskette drive and type **copy c:\config.sys a:** at the DOS prompt.

After backing up the Config.sys file:

1. Type **edit c:\config.sys** at the DOS prompt.
2. Add the line **device=c:\dos\himem.sys** to the top of the list. This command opens the high memory area for use.
3. Directly below that line, add **device=c:\dos\emm386.exe noems**. The NOEMS command indicates that the computer won't need expanded memory.

4. Add **dos=umb** and **dos=high** to the bottom of the list. These commands let DOS use the high memory area and the upper memory blocks. (See Figure 1.) (NOTE: If any of the above lines already appear in the Config.sys file, you don't need to add them again.)
5. Press ALT-F to open the File menu. Highlight the Save command and press ENTER.
6. Press ALT-F to open the File menu again. Highlight Exit and press ENTER.
7. Press CTRL-ALT-DEL to restart your computer and let the changes take effect.

MemMaker. A computer's RAM is sometimes compared to the top of a desk. Mail, memos, and reports cross a desk many times during the day. But at quitting time, all the information that hasn't been stored in a drawer or a file cabinet is thrown in the trash. Likewise, RAM keeps track of data that comes in while the computer is running. But when the power is turned off, everything that hasn't been saved to a storage device such as a diskette or hard drive is discarded.

RAM resembles the top of a desk in another way, too. The information that filters into an office during the day can clutter up the desktop, leaving little or no workspace. Similarly, the fluid stream of data that flows in and out of a computer's memory can bog it down with excess information, dramatically retarding processing speeds and making it impossible to run some applications.

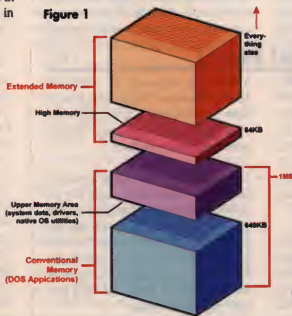
Fortunately, DOS 6.x offers a native memory management utility, MemMaker, that reorganizes data within memory for optimum operating efficiency. Memory management not only extricates a few RAM bytes but also improves processing capabilities and expedites data retrieval speeds. In fact, configuring the operating system for the most efficient use of memory is one of the best ways to maximize overall system performance, says Jim Langston, strategic marketing manager for OverDrive Processors at Intel.

MemMaker improves memory efficiency by loading memory-resident programs, also known as **terminate-and-stay-resident programs (TSRs)**, and device drivers (programs that let peripherals communicate with the rest of the system) into reserved or upper memory. This frees more conventional memory for use by DOS applications. (See Figure 1.) (TSRs are commonly accessed applications that remain loaded in memory for easy retrieval at all times, even when they're not in use.)

To run MemMaker:

1. Type **memmaker** at the DOS prompt and press ENTER to start the application.
2. The first screen asks if you want to continue. Press ENTER.
3. Choose the Express setup, then press ENTER.
4. MemMaker will ask if you want to use expanded memory. Unless you know for sure that you do, choose NO and press ENTER. If you later discover that you need expanded memory to run a certain program, you can run MemMaker again and change this setting.
5. Hit ENTER to restart your computer.
6. The computer will restart and return to the MemMaker screen, where it will prompt you to press ENTER again.
7. The computer will restart a second time and again will return to the MemMaker screen. This time, MemMaker will ask if the computer appears to be operating properly. Press Y. If you get to this point without any noticeable trouble, your system is running properly.
8. Finally, press ENTER a final time to complete the process.
9. The last thing you'll see will be a screen informing you of any changes made to your memory configuration. Press ENTER to return to the DOS prompt.

Figure 1



Reality check. Reality is that it takes longer for data to travel from the hard drive to the central processing unit (CPU) than from RAM to the CPU. Fortunately, in the computer world, you don't have to live by the rules enforced by reality. Creating a virtual disk lets users take advantage of the larger storage capacity of hard drives and the faster retrieval speeds of memory. (Also known as the micro-processor, the CPU is a chip that acts as the "brain" of a computer.)

Essentially, a virtual or RAM disk is a portion of memory disguised as a disk drive. The effects of creating a virtual disk are as beneficial as they are obvious. For example, data stored to a virtual disk is immediately accessible from memory, avoiding the delays inherent to hard drive data retrieval. And unlike disk caches and buffers, a virtual disk can store entire files of data. A virtual disk also has its own drive letter and is recognized as a storage device by Windows File Manager and DOS.

Ultimately, however, a virtual disk cannot hide its RAM roots. All data saved to a virtual disk is erased when the power is turned off because as a part of memory, it has no physical disk on which data is stored. Moreover, the area of memory reserved for a virtual disk cannot be used for other purposes. Therefore, computers with less than 12 megabytes (MB) of RAM are not viable candidates for a virtual disk.

The first thing to do before creating a virtual disk is to determine which version of the utility is on your computer. In most versions of DOS 3.2 or newer, the utility is called *Ramdrive.sys*. In some versions of PC DOS, however, the utility is known as *Vdisk.sys*. Scan your DOS directory for either of the above utilities. To

view the DOS directory, type `cd dos` at the DOS prompt. Your next prompt should look like this: `C:\DOS>`. Next, type `dir /p` to view the directory contents. To return to the ordinary `C>` prompt, type `cd ..` at the DOS prompt.

Regardless of which version you have, the installation instructions are essentially the same. Add the line `device=c:\dos\ramdrive.sys 4096 512 224 /e` (or `device=c:\dos\vdisk.sys 4096 512 224 /e`) to your *Config.sys* file.

The three numbers in this command (4096, 512, and 224) are variables indicating the kilobyte capacity of the virtual disk, the number of bytes on each sector of the virtual disk, and the number of directory entries in the root directory for the virtual disk, respectively. The default size of the virtual disk is 64KB, but you can build one as large as 32,768KB (32MB). Of course, you never can create a virtual disk larger than your RAM. The default size for each sector of a virtual disk in most DOS versions is 512 bytes but also can be 128 or 256 bytes. The default number of directory entries is 64 but can be any number between 2 and 1,024. Finally, the `/E` indicates that the virtual disk will be constructed in *extended* memory. `/A` indicates that it will be constructed in *expanded* memory. You only can use one of these switches, however.

You might have to experiment to find a virtual disk size that takes the biggest advantage of your computer system's capabilities. (NOTE: Always take extra care when adding or deleting commands in your system files. Backup before making any changes.)

A permanent swap. If a virtual disk is the simulation of a disk drive in the memory, a **swap file** is the simulation of memory space in a disk drive. To be more precise, a swap file is

an area of contiguous disk space reserved specifically for Windows (excluding Win95) to temporarily use when RAM becomes scarce.

For example, with four or five applications open on a desktop, you already may have filled your memory to capacity. To compensate, Windows automatically sends some of the data to a reserved portion of the hard drive for temporary holding. If you haven't established a permanent swap file, the data will be scattered around the hard drive, slowing down retrieval speeds. If you have created a permanent swap file, however, the data always will be stored as a single entity in the same location. This eliminates search time and accelerates retrieval speeds.

In addition to its usefulness, there are two other very good reasons for creating a permanent swap file. First, new technologies continue to expect more from system memory. But at \$40 per megabyte, many computer users can't afford to keep up with the demand. If you can afford to spare 20MB of contiguous hard drive space, creating a swap file will be the cheapest RAM upgrade you'll ever find.

Second, it's very easy to do.

1. Open the Control Panel icon in the Main program group.
2. Open the 386 Enhanced icon. (It looks like a small gray box with 386 written on it.)
3. Click the Virtual Memory box.
4. On the Virtual Memory screen, click the Change box.
5. Select your hard drive (probably the C: drive) from the Drive box and Permanent from the Type box.
6. Finally, pick a size for your swap file and enter the number in the New Size box. This number should be equal to or less than the Recommended Size. Ideally, a swap file of 10,240KB to 20,480KB (10MB to 20MB) is adequate, depending upon the size of your hard drive.
7. After you've made your decision, click OK, then Restart Windows for the changes to take effect.

Another way to improve performance, if only slightly, is to make sure the 32-bit Disk Access button at the bottom of the Virtual Memory screen has an X in it. (Windows for Workgroups [WFW] 3.11 users should check the 32-bit File Access button.) This lets the computer system transmit data to and from the swap file in Windows' 32-bit Protected mode rather than in the 16-bit Real mode of

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- Eliminate unnecessary TSRs. Many Windows users seldom, if ever, utilize a number of the DOS utilities available. Deleting unused memory-resident DOS utilities, such as *DOSKEY*, *KEYB*, *NLSFUNC*, and *SHARE*, can free some conventional memory. You can find out which DOS utilities are loading in your memory by typing `mem /classify /page` at the DOS prompt.
- Disk compression may get you a few more megabytes of storage, but it also puts a strain on your processor and crowds your memory. Decompressing a hard drive can free enough RAM to make

a noticeable difference on some computers. Remember: Prudent storage decisions such as storing only important files often solve a storage shortage problem better than disk compression.

- DOS applications often require a memory configuration quite different from that required by Windows. Creating a boot diskette for your DOS programs lets you permanently maintain an efficient memory configuration for Windows and still employ the necessary DOS memory configuration when you need it. Check individual program manuals for details.

DOS (i.e., the computer works with the data in 32-bit divisions instead of 16-bit divisions).

Most computers with hard drives of less than 500MB will have few problems running in 32-bit mode, as the necessary drivers are included in Windows. Users of computers with hard drives larger than 500MB may have to contact the hard drive's manufacturer to obtain the necessary drivers. If you encounter any problems after making the switch to 32-bit Disk Access, start Windows with the following switch at the DOS prompt: `win /d:f (win /d:c:f for WFW users)`. This disables the 32-bit Disk Access at startup, letting you return to the Virtual Memory screen where you can permanently disable it.

Solve Storage Shortcomings



Clean up that drive. Ideally, all information written to the hard drive is stored in contiguous clusters. This allows for the quick and efficient retrieval of related data. The first files and applications written to a hard drive usually are stored in precisely this manner. But as the hard drive gradually becomes saturated with more information, it can no longer afford this luxury. Applications are broken into pieces and stored in many locations on the hard drive. As a result, the **average seek time** (the amount of time required to move a read/write head to a particular location on a hard disk) is extended, and the **retrieval speed** (the time it takes the read/write heads to retrieve the information and pass it along to the microprocessor) languishes. This type of delay can make the whole computer system operate sluggishly.

The best and easiest way to avoid this type of system inefficiency is to periodically

defragment the hard drive, says Roger Reich, technical marketing manager at Maxtor Corp. "I think many people have never heard of this, but there should be a regular defrag of a system. It will impact performance," Reich says. Defragging—that's short for defragmenting—simply reorganizes the data contained in the hard drive into contiguous sectors for quick and easy retrieval. Fortunately, Win95 and DOS 6.x include a defragmentation utility as a native part of the operating system.

Before defragging, though, run CheckDisk and/or ScanDisk for a quick diagnosis of any problems on your hard drive. At the DOS prompt, type `chkdsk`. (Windows 3.x and OS/2 users should make a full exit to a DOS prompt to run these utilities.) This will quickly analyze your hard drive to determine how data is distributed there. It also will inform you of any storage errors or damaged files.

If your computer is capable of running ScanDisk, it will advise you to do so after CheckDisk has completed its examination. Type `scandisk` at the DOS prompt. ScanDisk will run a comprehensive check of the disk surface to ensure that every location on the hard drive is capable of having data written to and read from it.

To run ScanDisk from Win95:

1. Left-click the Start icon and highlight Programs.
2. Left-click Accessories.
3. Left-click System Tools.
4. Left-click the ScanDisk command.
5. ScanDisk will ask if you prefer to run a standard or thorough scan of the disk and if you want it to automatically fix any errors it finds. The first time you run the application, however, it's advisable to observe the errors before fixing them, so this box should be left unchecked.
6. Left-click the Start button and let ScanDisk do its thing. Win95 users don't need to run CheckDisk.

After you have completed the preliminary work, DOS users should type `defrag` at the C> prompt. Win95 users can activate the defragmentation utility by returning to the System Tools group and left-clicking the Disk Defragmenter command. In both DOS and Win95, decide which disk you want to defragment and left-click OK or hit ENTER. Next, left-click the Start button or hit ENTER again.

A disk defrag only takes a few minutes to run; compressed hard drives will take slightly

longer to defrag. Reich recommends defragging your hard drive at least once a month.

Double up! While the defragmentation utility maximizes the performance capabilities of the hard drive, the disk compression utility included with DOS 6.x and Win95 actually maximizes the hard drive. Some users think that disk compressors increase the physical disk space of a drive. After all, how else can a 256MB drive have a 400MB capacity? However, as its description makes evident, a disk compressor actually compresses the data stored to a disk.

Think of it this way. A small bowl may hold three whole apples. Or, it may hold six apples that have been mashed into applesauce. The capacity of the bowl has not changed, but the form of the apple has. Likewise, the physical size of the hard drive does not change after compression, but the form of the data does.

Fortunately, compression won't mash your information into data-sauce. In fact, data compression occurs quite regularly within a computer system. For example, some data files, such as those that have an .EXE or .COM file extension, are compressed permanently when they're created. Also, most of the data available on the Internet travels in compressed form only. Your computer knows its compression boundaries and only will compress data that can be safely retrieved and used later.

For DOS DoubleSpace users:

1. DOS versions 6.0 to 6.2 come equipped with the DoubleSpace utility. Type `dblspac` at the C> prompt.
2. Use the ALT-C combination to select Existing Drive from the Compress menu at the main screen.
3. Use the arrow keys to select your hard drive, which is usually the C: drive, from the list of compressible drives.
4. The screen will prompt you to press C when you are ready to compress the drive. Press C. DoubleSpace will tell you how long the compression will last.

For DOS DriveSpace users:

1. DOS 6.22 uses the DriveSpace utility for disk compression. (Due to a lawsuit between Stac Electronics and Microsoft, DOS 6.21 includes neither DoubleSpace or DriveSpace.) Type `drvspace` at the C> prompt.
2. Select Express Installation and press ENTER.
3. Choose Continue and press ENTER. DriveSpace will conduct a scan of the to-be-

compressed drive. It then will restart your computer and begin compressing the drive. DriveSpace, like DoubleSpace, informs you of the compression time.

For Win95 DriveSpace users:

1. Left-click the Start button and highlight Programs.
2. Left-click Accessories.
3. Left-click System Tools.
4. Left-click DriveSpace to initialize the DriveSpace utility.
5. From the DriveSpace window, left-click your hard drive, which is usually the C: drive.
6. From the Drive menu, select the Compress command, then left-click the Start button.
7. A new box will appear to verify your decision to compress. Left-click the Compress Now box to complete the compression procedure.

Don't be concerned about which compression program you have. DriveSpace has proven to be more effective than DoubleSpace, says Alec Saunders, product manager for Desktop Operating Systems at Microsoft, but both will provide a hard drive with much-needed storage space. "DriveSpace has some capabilities in it that allow it to ensure that the data written to the disk is 100% true to what was intended to be written to the disk," Saunders says. "But provided you have quality hardware, DoubleSpace is a reasonable solution."

Compression can increase the size of your drive by as much as 50%, although 20% to 40% improvements are more likely. Unfortunately, compression also can lower the processing speed of your CPU. Keep reading for more information.

Smarten up your drive. To take advantage of memory's expeditious retrieval speed and

thus improve system performance, many computers are programmed with a **disk cache**. A disk cache is a reserved portion of memory that acts as a buffer between the CPU and a disk. When a program requests data from a storage device, the requested information first passes through the disk cache on its way to the microprocessor. The disk cache temporarily stores the data that passes through it. If that data is requested again, the program quickly can locate and retrieve the data from the disk cache rather than waste time searching the hard drive.

Not all computers have a disk cache installed, though, and some computers don't have a large enough cache. If you notice that your read/write times seem to be a little sluggish, it's probably time to inspect that disk cache.

To make the job a little easier, MS-DOS 4.0 and newer and PC DOS 5.0 and newer provide the SmartDrive utility. (Win95 has a built-in,

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- Another easy way to avoid system inefficiency and improve hard drive performance is to always reserve 10% of the hard drive for pad space, says Reich of Maxtor. Not only does this ensure that you'll always have room to save your files, but it also prevents file thrashing. As mentioned above, related data is ideally stored to the hard drive in contiguous sectors. A full hard drive may not have any contiguous sectors available, though, so related data is scattered, or thrashed, throughout the disk. This slows down the average seek time and retrieval speeds.

- Clean out the temp files. A computer automatically creates temporary files for short-term memory. These files let a computer keep track of the constantly changing data of a work in progress. Although they're quite necessary during the development of a document, the temp files become unnecessary once the document is permanently saved. Add the line `set temp=c:\temp` to your Autoexec.bat file (or amend the current Set Temp line). This creates an easily accessible TEMP directory that will collect all files with a .TMP file extension in one location on the hard drive. By periodically opening this directory and

deleting all files that have gathered there, you'll keep your computer clean.

- Fonts are another space waster. Win95 provides a Fonts folder in Control Panel that lets you view, and then delete, unused fonts. Fonts don't take up a lot of room (usually less than 5MB for all of them), but if you only use one or two font types, you can download the extra fonts to diskette or delete them completely to give your hard drive a little breathing room. Highlight the fonts you don't need and use the cursor to drag them to the diskette drive icon in My Computer. Or press DELETE to get rid of them for good.

- You can eke out a few more megabytes of storage by partitioning the hard drive when you format it. Partitioning lets you get more efficient usage of disk space by eliminating the empty space left over when a small program is stored in a large area. To partition:

1. Type `fdisk` at the DOS prompt and press ENTER.
2. Select the Create DOS Partition option and hit ENTER.
3. When it asks if you want to use the entire disk for the partition, select No and hit ENTER.

4. The next screen will ask you to designate the size of the partitions. You can create partitions of any size, but remember that you can't change them without reformatting the hard drive.

5. After setting the configuration for your primary drive, the screen will ask if you want to use the rest of the disk; choose Yes.

6. Repeat the above steps until you have used the entire capacity of the drive. Only the drive that will operate as your primary drive should be set as active.

7. Provide each ancillary drive with an identifying drive letter, such as D:, E:, F:, etc. C: is the identifying letter of the primary partition.

8. Finally, format each drive. Note that you cannot adjust your partitions without reformatting the hard drive, so be very certain of how you plan to use your computer before you begin partitioning.

- Backing up your data, either to diskettes, a second hard drive, or a tape drive, also may save you a lot of time and energy down the road in case anything ever happens to your hard drive. Reich of Maxtor advises backing up biweekly or monthly, or at the same time you defragment your hard drive (see above for details).



Colors By Fuji (Of course.)

Hey, who turned on the color in the computer products aisle?
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Packs are a brighter, more efficient way to organize your data.
And they're a lot more fun, too, of course.



Computer Products

intelligent disk cache that automatically adjusts whenever necessary, so the user always gets maximum performance from the disk cache.) To activate SmartDrive, exit Windows completely and type `smartdrv` at the DOS prompt. The SmartDrive screen outlines memory allocation and defines the size of the disk cache.

To create or adjust the size of the disk cache for MS-DOS 4.x and 5.x and PC DOS 5.x:

1. Open the `Config.sys` file by typing `edit config.sys` at the `C>` prompt.
2. Add the line `device=c:\dos\himem.sys` to the `Config.sys` file if it's not there already.
3. Directly beneath this line, add `device=c:\dos\smartdrv.sys 2048 1024`. The two numbers are the variables that control the size of the disk cache. In this case, 2048 indicates that the size of the disk cache in DOS will be 2048KB (2MB), and 1024 indicates that the size of the disk cache in Windows will be 1024KB (1MB). Systems with 16MB or more of RAM might be capable of running a cache of 4096KB or 8192KB, but improvements won't be as noticeable after 2048KB.

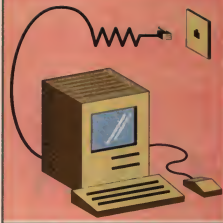
Regardless of how much space you allocate for a disk cache, remember two things. First, the variables always must be divisible by 16. Second, always make sure you reserve enough RAM for your system because it can't use any of the RAM appropriated for the disk cache.

DOS 6.x users need to edit the `Autoexec.bat` file instead of the `Config.sys` file.

1. At the DOS prompt, type `edit autoexec.bat`.
2. Add the line `c:\dos\smartdrv 2048 1024`. This line performs the same function that the `Config.sys` line performs in earlier DOS versions. Adjust the numbers accordingly. To exit and save the `Autoexec.bat` and `Config.sys` files, press ALT-F to open the File menu. Highlight Exit and press ENTER. A window will appear, asking if you want to save the file. Press Y. This will return you to the DOS prompt.

(NOTE: Never edit the `Config.sys` or `Autoexec.bat` file without backing up. Prior to editing, insert a diskette in the diskette drive. At the DOS prompt, type `copy c:\config.sys a:` and hit ENTER to copy the `Config.sys` file to the diskette. Or, type `copy c:\autoexec.bat a:` and hit ENTER to copy the `Autoexec.bat` file to the diskette.)

Oust Online Obstacles



Pull the ol' switcheroo. There's no better time than the present to give your online service or Internet service provider (ISP) the value test. The Telecommunications Act of 1996 created an environment where almost anyone can offer an Internet connection, and it seems that almost

everyone does. This increased competition has led to rapidly decreasing prices for online time and better service for customers.

Make a list of your online computing needs, then find a provider that offers the best value in meeting those needs. Take advantage of the free trial months offered by most online services and ISPs to see which best suits you. Compare ease of use, convenience, quality, abundance of content, and the amount of time you'll use the service to cost. Pay particular attention to per-hour costs: The \$2 and \$3 hourly fee charged by some online services may be more costly than the all-you-can-browse deals offered by others. Also consider the cost of extras; do you need to buy a Web browser, or is one included?

Don't forget to check out the up-and-coming players. Some cable television companies and long-distance service providers now offer direct Internet connections. After looking around, you may discover that the well-organized content of the online services is worth the extra money. You also may find that the Web is the only place you want to spend your time. Our advice: Shop around. You don't have to go with the first service that sends you a free diskette.

Extra! Extra!

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- Turn off your screen saver before downloading anything. At best, the system resources could be better spent expediting a lengthy download; at worst, the screen saver could interrupt a fragile Internet connection and trigger an error in the file or prematurely disconnect the download.
- Compose E-mail offline. Use a word processor to compose a message, then cut and paste the text onto the message area of your E-mail application. Or use a utility, such as America Online's FlashSessions tool, that was specifically designed for the purpose of maximizing online time. FlashSessions lets users work with the E-mail application offline. Upon completion of the message content, the utility automatically connects to AOL, sends the note, then disconnects.
- Set modem speeds for the highest possible transmission rate. Although most modems only will allow data transfer speeds of 14.4 kilobits per second (Kbps) or 28.8Kbps, Win95 users can set their

modems for a higher rate. It won't expedite the transfer of data between PCs, but it may accelerate the movement of data between the modem and CPU. Double left-click the Modems icon in the Control Panel. Left-click Properties and set the maximum speed to 57,600. Make sure there is not a check mark in the Only Connect At This Speed box. Left-click OK to exit.

- Disable the image loader when browsing online. Graphics files contain substantially more bits of data than text files. Disabling the image loader lets the pages load much faster initially. After reading the textual content, you then can take the time to view the pictures that accompany it. Netscape users can look in the Options menu for the Auto Load Image command. Mosaic users can find the Auto Load Image command in the View menu. Microsoft Internet Explorer users need to dig a little deeper. Look in the Options command of the View menu; in the Appearance window, click the Show Pictures button to deactivate the image loader.

Productive Printing



Rough (but thrifty!) drafts. Before any document is seen in its final form, it usually undergoes a number of revisions. Each of these printed rough drafts depletes the ink cartridge and uses another sheet of paper. This might not be much of a concern with shorter documents, but longer documents or detailed images require a lot of ink and paper. To minimize waste on those rough drafts that just end up in the trash, follow these simple steps.

First, use the draft-quality print mode. Most word processing applications include an option for selecting draft, medium, and high-quality printing drafts. In *Microsoft Word 6.0*, for example, choose the Print command from the File menu, then click the Options button and select Draft Output. In *WordPerfect 5.1* and newer, press SHIFT-F7 to open the Print screen. Press T to adjust Text Quality and select Draft Mode from the list of options.

Second, you can save ink by reducing the dots per inch (dpi) printer setting. (The dpi measures the resolution of a printer or scanner. The higher the dpi, the sharper the image will be.)

To reduce the dpi for Windows 3.x users:

1. Double-click the Printers icon in Control Panel in the Main group.
2. Choose the Setup button.
3. Change the Print Resolution from 300dpi to 150dpi or 75dpi.

For Win95 users:

1. Double-left-click the active printer icon in the Control Panel.
2. Open the File menu.
3. Left-click the Properties command.
4. Open the Graphics page of the Properties screen and adjust the Print Resolution. This won't be acceptable for a final draft, but for a rough draft, it should work just fine.

Third, use an ordinary, less-complex typeface, such as Arial, Courier, or Times New Roman, rather than an elaborate, ink-intensive typeface, such as Algerian, Braggadocio, or Matura.

Finally, print on both sides of the page and use single spacing for rough drafts. Hand-feeding each page through the printer during double-sided printing may be a little inconvenient, but it can effectively cut your paper waste in half. And when your laser printer cartridge starts to run low, remove it and give it a shake. That should loosen up just enough ink to print a few more pages.

Maintaining the printer. Printer maintenance can take many forms. The most important, yet least obvious, method of printer maintenance is to update your printer device drivers on a regular basis. While your printer might work fine with your current drivers, the printer manufacturer may have discovered a way to tweak performance even more. These drivers usually are available at the printer manufacturer's Internet site, or you can call the manufacturer directly and request them on diskette. Registered printer owners should be able to obtain new drivers for free.

Make sure that the cords are plugged in correctly. The most efficient distance between a computer and a printer is a straight connection. Connecting the printer directly to the computer rather than through a switching box (a device that lets a network of computers use the same printer) will decrease the time it takes for the data to travel from the computer to the printer.

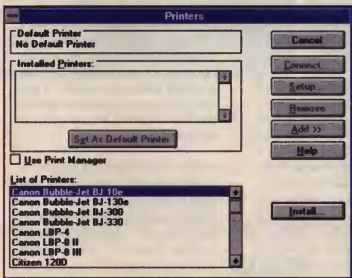
On a related note, if you're not using the many features of Print Manager, disable it. Although Print Manager offers many useful functions for network printing and intensive printing demands, it can impede performance on a single computer/single printer setup.

To disable Print Manager, double-click the Printers icon in the Control Panel. Click the Use Print Manager box so that there isn't an X in it.

Finally, you need to treat your printer with care. Use a dust cover and avoid smoking around the printer so that ashes don't fall into it. Use the paper recommended by the printer manufacturer.

Try to regulate the humidity in the room because it can lead to paper jams and faint or smudged printing. You should clean the printing mechanism with a can of compressed air; don't use soap and water. And never, ever sit food or drinks on top of the printer.

The quality of total system performance often depends greatly upon how an individual actually uses the computer. A user's personality and work habits affect computer productivity and efficiency just as much as system capabilities.



To improve printing performance on a single PC/single printer setup, disable the Print Manager, which can be found in the Printers dialog box.

Put The PC Into High Gear



No reason for excess. Unnecessary data bogs down a computer in many ways. It occupies space on the hard drive, hogs memory, and slows down processing speeds. To optimize overall system performance, eliminate superfluous documents, files, and applications from your computer.

Start by browsing through the DOS directory, Windows File Manager, or Win95's My Computer in search of documents and small

files that haven't been used in the past few months. Download the files to diskettes. Using File Manager in Windows, simply drag the file icon to the diskette drive icon. Win95 users can do the same thing using the My Computer feature. In DOS, type `copy c:\<file name> a:` (without the brackets) at the DOS prompt. Make sure to clearly label the contents of the diskettes and put the current date on each one. Review your diskette collection every few months. Documents and files that haven't been used for at least six months could be converted to hard copy and/or deleted.

Next, delete applications that you don't use, especially multimedia entertainment applications, educational programs, and seasonal software, such as gardening or tax-preparation applications. You also should delete pirated software as well as any unregistered free-ware or shareware applications. Legally, you can't have these programs on your computer

anyway, and discarding them might improve system performance.

Screen savers, wallpapers, sound clips, graphics, and readme files also may be downloaded to diskette or deleted. Although many computer users decorate their computers with screen savers, you probably don't need to run one. Monitor technology

has developed to the point where the image burning into the screen is no longer a threat to most newer monitors.

Use the Uninstall feature of an application for easiest removal. If you don't have that option, you can highlight the application in Windows File Manager or Win95's My Computer and press DELETE. Or in DOS, type `deltree c:\<file name>` (without the brackets) and hit ENTER. To delete a program group from your

desktop, highlight the group and press DELETE in the Windows 3.x environment. Win95 users should:

1. Left-click the Start button and highlight the Settings menu.
2. Open the Taskbar menu.
3. Open the Start Menu Programs page and left-click the Remove button.
4. Highlight the program group and left-click the Remove button.

Finally, get rid of unnecessary and empty directories and subdirectories. Consolidate information and make sure each directory has at least two or more subdirectories or files. Similarly, delay upgrading or adding new applications. Just because you have one gigabyte (GB) of storage space doesn't mean you have to fill it. Always consider how much you really need a program before you buy it. Put things into perspective. Do you really need that vacation-planning software for your weekend trip to Toledo? Will your office seem any more festive if you buy those holiday screen savers? Whether the answer is yes or no, make sure you know for sure before you install an application. ●

by Jeff Dodd



Remove any unnecessary program groups to clean up your Desktop.

Extra! Extra!

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- Some computer users choose to keep their computer running overnight. While this may have some advantages in certain situations, there are absolutely no advantages to keeping a monitor on overnight. Unplug your monitor to avoid needless wear and tear as well as to save a little energy.
- Organize your computer desktop. At some point in your computing future, you undoubtedly will decide to perform multiple functions at once. For example, you may use the Calculator while working on a database. However, if you can avoid running unnecessary applications while performing a necessary task, processing time will improve, and the possibility of RAM cram (a memory overload) will decrease. Maintaining an organized desktop will help you

remember which applications are open and remind you to close the programs you have finished with.

- Stay in contact with your computer and peripheral manufacturers, and take advantage of offers of new drivers. Although your current drivers may work just fine, manufacturers often find small ways to improve performance, and they're more than willing to ensure your happiness as a customer by passing that technology on to you for free.
- And last but not least, keep a copy of PC Novice next to your computer at all times. Calls to technical support can be frustrating, expensive, and time-consuming. Avoid this modern plague by gaining the computer know-how to handle many of these problems yourself.

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Getting The Most Out Of Technical Support



Technical support sounds like a good thing. You have a problem; you call to get help. Unfortunately, technical support has built a reputation for marathon hold times and requiring you to jump through hoops to get what you need. Whether you call a computer company, software company, or on-line service, technical support often is plagued with long hold times. Most companies require you to identify yourself through identification or serial numbers, making you feel more like a number than a person. A few even demand a credit card number and charge you for the support. It can seem more hassle than it's worth.

Lately, it seems a number of companies are improving their support. Perhaps they've discovered that consumers are tired of getting the runaround and now are buying from

companies who make quality products and stand behind them. Many of the bigger technical support departments have goals of two minute on-hold times on average, incorporate help through online services and the Internet, and include more free support through toll numbers. While this all sounds good, keep in mind that two minutes is still an average, and it doesn't mean that's how long you'll hold during peak hours. Also, if your question doesn't fit what's outlined as free support, you could end up paying about \$30 for the call.

There are, however, a few things you can do to make your technical support call a more pleasant experience. You won't necessarily avoid getting put on hold or paying a fee, but if you know the tips for technical support, you can get the help you need as quickly and painlessly as possible.

■ When To Call

First of all, make sure that the problem actually warrants a call to technical support. Have you checked all the minor details? Is

everything plugged in and turned on? Was the program or hardware installed properly?

For instance, Karl Turzi, support supervisor for the technical specialists team at CompuServe, says many problems could be avoided when the user installs the software. Most communications software will let you specify the particular type of modem you are using so the software will operate at the proper settings. If you use the generic settings, that may cause some of your bugs. Or, if you're having trouble simply dialing out, make sure you have indicated that the modem is on the correct COM port. (Most computers can support four communications, or COM, ports that devices such as modems use to connect and communicate with the rest of the system.) Trial and error of the other COM port settings can ensure that the communications software is really working with the modem's COM port.

"You feel sorry for someone who sat on hold for 10 or 15 minutes to tell them they were trying to dial their mouse," Turzi says.

Have you checked the manual? Though it's reassuring to have a quick fix or verbal instructions, sometimes the time and cost aren't worth the security.

Most manuals include a troubleshooting section at the back with solutions to common problems, such as ones occurring when installing a program or configuring it to work with the hardware and software you have. Some computer systems have built-in manuals stored on the PC with additional information. They also may include special help items. For instance, IBM's Aptivas include *AptivaWare* that helps users figure out how to do things such as format diskettes, make backup copies, or install additional software. Packard Bell offers a Quick Start Guide to help users through the basics of their computers. On the software side, most developers include numerous options in the Help menu and pop-up tips that assist users with "how-to" questions or common troubleshooting.

Other options you might try (if your computer is still operational, that is) are online. Users can connect via modem to company bulletin boards and Internet sites to view troubleshooting tips. Several companies also have special locations on popular online services in which users can locate information on performing certain functions or fixing common problems, or they can ask other users for assistance. On top of that, many companies offer automated, toll-free phone lines you can call to choose from a menu of options and listen to quick answers or have them faxed to you.

If you've covered all the bases and still can't find a solution, it's time to call a live person for help. The best times to call, especially if the call is going to cost you long-distance charges, are during a down time, when most people won't be calling. For the majority of companies we talked to, that was either late at night or early in the morning. Mike Reiter, IBM spokesperson, says figuring out the best time to call just takes common sense. Peak time, or when most people call for support, is when users are ordinarily at their computers, which is during business hours or right away when they get home from work.

■ What To Have On Hand

Another thing that will gobble up those long-distance minutes is the time it takes to decipher your problem and figure out exactly what kind of setup your computer has.

Lane Howell, director of technical support for WordPerfect business applications at Corel, says before you call, identify your computer's make, the operating system (including the version number) you use, and all the related

pieces and parts (for instance, know what model and type of printer you have if you're calling because *WordPerfect* won't print using your printer).

"Sometimes, it takes the technician five minutes to illicit from the customer enough information that we can just begin to diagnose the problem," Howell says.

You also will need to know the computer, hardware, or software's serial number for record keeping or warranty purposes. This indicates to the manufacturer exactly what type and version of the product you have.

A few companies, such as Corel, also require a personal identification number (PIN) that they can plug into a database and use to locate all your license numbers and so forth.

Before You Call

Here are the things you need to know about your computer's setup before you start dialing technical support:

Computer System

- System purchase date (for warranty purposes)
- System type
- Error message(s) displayed
- Any peripherals hooked into the system
- System serial number
- What applications were running when the problem occurred
- Any system backup CDs or diskettes

Online Service

- Your name and address
- Your user name and password
- Error message(s) displayed
- Your modem make and model

Hardware/Software

- Your system configuration
- Your product identification number and/or model number
- Error message(s) displayed ○

However, only users that have sent in their registration cards will receive PINs. At Corel, you still can call without one; it just may take a little more time and hassle on the phone. Therefore, no matter what the product, it's always a good idea to have sent in the registration card before calling. Some companies even require you to register before they offer any support. This is especially true of **shareware** software. (Shareware products are try-before-you-buy software that you can test for free, then pay for the manual and usage rights.)

If you're calling an online service, however, you don't necessarily need all that information. Most will ask your name, along with your user name and password. It's probably also a good idea to know about your system, though, especially your modem make and model.

Just to be safe, keep a record of any modifications you have made to the computer, such as adding extra random-access memory (RAM) or attaching a printer. You'll also want to have handy any user manuals or other documentation that the technician may refer to.

Finally, document the problem as best you can. Jot down error messages or numbers as well as the steps you performed before the problem occurred. Also make a note if anything has changed recently on your system. For example, try to remember whether the error occurred before or after you installed new hardware or software or if you've recently moved your computer.

■ Start Dialing

When you call, make sure you've set aside enough time to stay on the line and fix the problem. Also, be within reach of your computer.

John Halavac, vice president of international service and support at Packard Bell, says the majority of the time, the technician needs the caller to perform several actions to see how the PC reacts or will walk a user through how to fix the problem. That's hard to do when you are at work and your system is at home or vice versa.

If your problem is with a modem or online service, try to use a second telephone line that isn't connected to the computer. If that's not an option, you may have to try out a few tricks the technician passes along, then call back, or E-mail your question to the company and wait for a fix-it reply.

While you're still on the line, it's a good idea to write down the name or ID number of the

technician who is helping you and a brief description of the problem and solution. This will help if the problem occurs again or creates another problem.

■ Whom To Call

All the preparation in the world won't help if you call the wrong company. What a waste to spend 30 minutes on hold just to find out you have an operating system problem instead of a software one!

How do you know whom to call? Again, use common sense. Apple spokeswoman Cindy McCaffrey says if the problem is occurring in more than one application or is not specific to any particular application, it's more than likely something in the operating system that its developer can handle. If the problem is happening in only one application, it should be handled through that software developer.

The same reasoning applies to hardware. If you have trouble printing with one program but not the others, there's a connectivity problem between that software and the printer, which requires help from the software company. If you're experiencing problems printing with all your programs, however, it's likely you have a printer error. Or, if you don't have any problem connecting with your modem to send a fax but you can't connect to your online service, you probably didn't properly configure the online service software. But

if you can't send a fax or connect out, there might be a modem defect.

The company you bought your computer from also can fix many of your problems, provided your question is about the hardware or software that came with the computer. Some will have a time limit during which they will answer software questions (which includes operating system questions), while others offer unlimited support.

■ If It Isn't Broke . . .

Generally, the support you receive is free if you have an actual hardware or software problem with a product. However, if you have a "how to" question, such as how to create a spreadsheet or import images into a graphics program, you'll probably be charged.

For instance, if you have a problem with your IBM computer or the hardware that came pre-installed, the company will help you fix it at no charge. If you're having problems with the software or operating system that came bundled with the system, IBM also will offer support for getting it up and running for the first 60 days you have your computer. After that, any questions you have about the software will cost \$35 per call. Reiter says calls during the first 60 days are often problems with getting the programs working, while calls after that are more about how to use a product. Packard Bell has a similar policy, Halavac says, with the slight difference that it will offer

unlimited support for the bundled software. The motto there, however, is that if something is actually wrong with the software or hardware, Packard Bell will help you fix it. But if the product is working and you want to know how to do something, you'll be asked to go through Premier support, for which you're charged \$2 per minute or \$29 per call.

And if you're calling an online service company, most of the bigger ones such as CompuServe and America Online give you free support, whether it's a connection problem or if you want how-to help. The reason for this is that most don't offer a manual to users, and many calls are billing-related.

Overall, we found that technical support companies are working on the poor hold times. They also will give you free support, but many are getting tired of footing the bill for the call and are going to toll numbers.

If you do run into problems and believe the manufacturer isn't making a good-faith effort to assist you, try *PC Novice's* Action Editor. If the company didn't perform up to its promises, we'll help you get the service you deserve.

Technical support can be a satisfying experience if you are prepared and know what to expect. Know your computer and check the documentation with your product so you know what support options are available and aren't surprised by hidden charges. ●

by Cindy Krushenisky

Support Services

Companies	Support Options	Best Time To Call
Packard Bell:	Some systems let technicians dial into a user's computer. Free support for computer hardware on toll-free line and for bundled software on toll line. How-to questions go through Premier support (\$2 a minute via 900 number with a maximum of \$35, or \$29 per call on 800 number).	Average hold time 5 to 10 minutes. Best to call in early morning or late evening.
IBM:	Hardware toll-free calls are free. Software calls are free for first 60 days, then cost \$35 a call.	Average hold time 5 to 10 minutes. Best to call in early morning, late evening, or on weekends.
America Online:	Toll-free support.	Average hold time of 10 minutes. Best to call early in morning or late afternoon.
CompuServe:	Toll-free support and other online help areas.	Average hold time of about 5 minutes. Best to call early in morning or late at night.
Corel:	Free support over toll call.	Average hold time of 4 minutes. Best to call mid-morning and late afternoon.
Microsoft:	Free support over toll call for home and business products. First operating system call free, and all calls for 90 days following are free. After that, \$35 a call.	Average hold time for software and operating system of 2 minutes. Avoid calling over lunch hour.



What To Do When PCs Won't Start

As useful as computers can be, your work often can be halted before it starts when you run into problems just turning the PC on. Starting up a computer, a task that should be so easy, can suddenly become stressful when inexperienced users face an unresponsive system.

There often is a simple solution to the problem, however, and simply pinpointing the source of trouble can provide a sense of relief. Whether the solution is as simple as plugging the computer into the outlet or as complex as sending for a new monitor, it's comforting to at least know the source and severity of the

trouble. There are many ways to pinpoint problems encountered when you turn your computer on and nothing seems to happen. If you're faced with such a situation, the first thing to do is put aside your panic and try to determine whether the problem lies with the hardware or software.

■ Hardware

If you're looking at a blank screen, the hard drive is silent, or no lights appear on the front of the case, don't jump to the conclusion that your PC needs repair. Check that all of the many wires and connections are plugged in properly. The power supply from the wall outlet to the monitor and the monitor's connection to the system unit both must be working properly. If those connections appear to be intact, check the outlet your system is plugged into. You may need to flip a light switch in the room to get power flowing to that socket. Your

socket also could have a circuit breaker problem. Many users assume a problem must be with the PC and don't think about flipping the switch on their circuit breaker to make sure it's on. If these steps produce nothing, try plugging the system into another socket.

If the system seems to be working (you see the power light come on and hear the hard drive spinning or other sounds) but there's no picture, then you presumably will focus on your blank monitor. Checking the absolute basics is the easy part. Make sure you've turned on the monitor. It's common to press the "On" switch and think that the monitor is on when you actually haven't pressed the power switch hard enough for it to take. Go back and depress the switch enough that the electrical components are actually turned on. A red light beside the power switch usually indicates when the monitor is on.

If your process of elimination has led to what you would categorize as a hardware problem, you have two options. Mike Reiter, an IBM spokesperson, says the first thing you should do for a hardware problem is go to your owner's manual (an option that's often overlooked). Many users who call technical support for advice have simply bypassed the documentation that is right at their fingertips for either the monitor or the system, Reiter says. Most manuals have a troubleshooting section with solutions to common problems and a variety of tips. Reading the manual also saves you the cost of a long-distance call to tech support and the ensuing time spent on hold.

However, Walter McFashion, manager in service and support for Packard Bell, says if the manual is not helping, you should call the technical support line whenever there is doubt about anything. McFashion says a novice user obviously will be a little intimidated at first or just not know what to do. Thus, calling the help line is a good way to find the answers you need. The technicians will offer troubleshooting tips and steps to help you pinpoint exactly where the problem lies based upon the symptoms you describe. For the best results, there is specific information about your system that you should have

available before you call a technical support line. For more information, see "Getting The Most Out Of Technical Support" in this issue.

David Hinz, technical marketing engineer at Intel, says that if you are trying to solve the problem yourself, be sure to handle your computer system with great care. While it may seem durable, it's actually very fragile, just like any other electronics you may own such as your stereo or television. Hinz cautions new users not to make any attempt to open the system box and poke around without technical assistance.

■ Hangups

If your system seems to be working for the most part but often hangs (hesitates repeatedly or performs extremely slowly) or locks up, either during bootup or even during regular use, one of your best options may be to just start over. If you can, first go through the steps to shut the computer down, which include choosing Exit Windows from Program Manager's File menu in Windows 3.x or Shut Down from the Start menu in Windows 95. Then restart your system. But in the case of a lockup, the only alternative is to restart the PC simply by shutting it off with the power button and turning it back on or to reboot with the Reset button. Often the system will come back after a reboot and run fine. If those two steps fail, however, you probably should get on the line to technical support.

Be sure to check your diskette drive, making sure no diskettes were left there. Most computers check the diskette drive during bootup before they check the hard drive, which is where the startup software usually is located. If you have a diskette in your diskette drive, it will halt your system bootup until the diskette is removed because the PC won't find startup information on the diskette.

■ Software

If you're having trouble opening a particular application, you're probably getting an error message or a Windows hourglass that simply sits on your screen. In these situations, there are a few general troubleshooting tips to try before dialing technical support.

First, quit all other applications. It's possible there just isn't enough memory available on your system to have yet another application active.

You also could try powering down the entire system and rebooting. Many times, you'll have some luck with this step, and everything will

come back up working fine. If your software is working, even if not at its peak, you always can go to the online Help menu in the program. It usually includes tips for a variety of possibilities.

If your software still refuses to do what you want, the next step is to call technical support. To do that, you must determine which company's technical support line to call. For problems with software packages you've installed yourself, for example, you will get solutions more quickly by calling the software maker. However, if the software was preloaded onto your computer by the company you bought the system from, then it's best to call the computer company.

McFashion says that Packard Bell supports any software shipped with its systems. A

software technician will try to pinpoint the problem and, if necessary, have you return your computer to its original factory configuration. McFashion cautions that before you follow those instructions, however, be sure you have a backup of your critical files since anything you have created will be lost. Most software problems, he says, can be handled over the phone.

Reiter agrees that most software problems can be diagnosed and solved remotely. In a way, he says, software problems are easier to solve than hardware mishaps because if the system is working and there is a particular problem, you can bring in the expert help. In the case of IBM's support center, it can fix a lot of software problems on systems with modems through a program that it preloads onto its



Where Did My Text Go?

It's easy, even for experienced users, to accidentally click the wrong button when playing around on a computer and wind up with a black screen. If you've ever experimented with the color palette in Windows 3.x or Windows 95, you may know what we're talking about.

One reason you could end up with an all-black or even partially black screen is if you've somehow selected your Windows appearance to be all black or all white. It's possible to get your text back to the system default and a readable form by following these steps:

- Press the DELETE key.
- Save changes, and exit.
- Restart Windows.

Windows 95

- Reboot your system.
- Press F8 as soon as your screen says it is starting Win95. You will get a Microsoft Windows 95 Startup Menu with eight choices. Choose Safe Mode Command Prompt Only.
- At the C> prompt, type `cd windows`.
- Type `regedit /e system.txt`.
- Type `edit system.txt`.
- Search for "colors" by pressing ALT, S, F, and typing colors. Press ENTER.
- Your first search will put you in the section with the header, [HKEY_USERS\Default\Control Panel\Appearance]. This is not the section you want so you will need to do a second search for "colors."
- Your second search should put you in the section with the header, [HKEY_USERS\Default\Control Panel\Colors]. Select or highlight this entire section including the header.
- Press the DELETE key.
- Save changes, and exit.
- Type `regedit /c system.txt`.
- Restart your system. ○

Windows 3.x

- Reboot your system.
- Press F5, or type c: if you don't have a C> prompt.
- Type `cd windows`.
- Type `edit win.ini`.
- Search for "colors" by pressing ALT, S, F, and typing colors. Press ENTER.
- The search feature should find the section entitled [colors] immediately. The colors section will not appear unless special color settings have been selected. If it is not there, Windows just loads the default colors.
- Select the entire section, including the header entitled [colors].

systems. Reiter says the technician at the support center has, with your permission, the capability to hook into your system, do a diagnostic check, and pinpoint a problem. Using the same phone line, the user can talk to technicians as the diagnostics are being run. Reiter says this system, called voice over data,

lets technicians explain what they are doing so you can follow and maybe even learn a thing or two.

Although computers may frustrate you to the point of tears, remember that somewhere there is a solution, and it's probably simpler than you think. You may find the solution on

your own, or it may be one that requires some outside help. Whatever the case, learning and practicing troubleshooting tips can take you one step closer to being a user who gives help rather than just receiving it. ●

by Angela Gay

FAQs

Just The FAQs . . . Frequently Asked Questions

The following frequently asked questions, and their answers, were compiled with the assistance of the IBM HelpCenter.

Q: *I'm having trouble running a new game. What do you suggest?*

A: The game could require a specific memory configuration. Check the game manual for instructions on making a "boot disk" to help run the game. Some manufacturers have created diskettes to help you make simple memory alterations yourself. If you're unsure of how to change system configurations on your own, you may want to check with your system's technical support line for guidance.

Q: *I got a new sound card to run multimedia software, but I'm having problems with the audio. What now?*

A: The problem could be the speakers or the software configuration. Try testing different speakers or even the headphones from a portable cassette player. If you still have trouble, try re-installing or reconfiguring the software.

Q: *I'm really interested in multimedia, but I'm confused about MPEG and M-Wave. What are they, and what should I look for?*

A: Motion Picture Experts Group (MPEG) is a widely accepted standard for full-motion video. Consider a machine with full-screen MPEG capability. To get the most out of multimedia with a portable machine, look for a large screen size. **M-Wave** is a technology that provides your system's

modem, fax, speakerphone, voice mail, and sound capabilities. With M-Wave, capabilities such as modem speed can be upgraded via software alone, giving M-Wave an advantage over a standard modem or sound card.

Q: *I want to hook a new printer up to my computer but was told I might need a driver. What should I do?*

A: First, check your operating system and software to make sure your printer is listed. You can do this by going into your system's Control Panel and opening the icon called Drivers. If your printer is not listed there, the printer manufacturer may have provided a **device driver** diskette with your printer. (A device driver is software that lets the PC communicate with peripheral devices.) Or, you could try downloading the driver from the manufacturer's online bulletin board or World Wide Web site.

Q: *I'm interested in the Internet and want to get a modem to try it out. What should I look for?*

A: The most important consideration is the speed at which modems transmit data via telephone lines. This is measured in kilobits per second (Kbps). The fastest modems widely available, and the speed you should look for, are 28.8Kbps (28,800).

Q: *I've heard there are a lot of files that can be downloaded from online bulletin board systems (BBSes). What kinds of information do they include, and where can I find them?*

A: Bulletin board systems typically include updated software "patches" and the latest

device drivers that help operate peripherals such as a printer or mouse. Many manufacturers offer BBSes that you can access by dialing a telephone number with your modem. In addition, there are Internet and World Wide Web sites, which provide updated software and product information. Check with manufacturers for details on finding their online information, or use online search tools to find the sites.

Q: *How can I get answers to my questions online?*

A: Many vendors offer online support. For example, IBM sponsors forums on Prodigy, America Online (AOL), and CompuServe. All three services feature information exchange areas, monitored by IBM specialists, where you can post questions and share tips with users worldwide.

Q: *How do I make sure all the information on my computer is saved in case I have a serious problem with my system?*

A: You should create backup diskettes for your data, applications, and operating system. These diskettes will allow you to recover from most problems.

Q: *I'm thinking about getting Windows 95. How do I find out if it's compatible with my system?*

A: Check compatibility lists from Microsoft as well as the manufacturers of your computer, printer, and other peripherals. This information can be found on the companies' online bulletin boards or through their fax-back services. ○

Personalizing Your PC

Although there are few distractions in a perfectly neat work area, most of us prefer to work in a less sterile environment. We choose to make these spaces our own with sticky notes, family pictures, plants, toys, and miscellaneous accessories. The old adage that says, "The work we do is a reflection of ourselves" also can be applied to the area in which we work.

There are many ways to add your own touches to a computer workstation. You can begin with small rebellions such as changing the colors in your operating environment or pasting a favorite photo to the monitor. As you grow bolder, you might look for more tangible oddities. Manufacturers are eagerly cranking out gadgets galore to assist you in this quest to make your PC itself, not just the information in it, say something about you.

■ Interior Design

The look. Most people start their customizing on-screen. Staring at the monitor all day everyday would get a little old without some form of entertainment or "personality" adding spice to your computer time.

A screen saver is the most common (many would say banal) personalization method. The idea began with monochrome monitors sold in the early to mid-eighties that could burn an image permanently into the screen if left on one screen too long. The troubles of the old monochrome monitors have long since passed. With today's monitors, there's little threat that an image will be permanently burned into your screen, but the colorful activity of screen savers has remained popular for sheer entertainment purposes. The variety of savers available is enormous; it is possible to walk through an office of 300 people and not see the same screen saver twice. There are screen savers for almost every hobby, movie, music group,



comic strip, conversation topic, or any other facet of your personality you want to exhibit. If prepackaged screen savers, which usually cost \$20 to \$40, don't reach the personal level you're trying to acquire, there are alternatives.

With *ChromaZone*, from Gibson Research Corp., you can create your own graphics screen saver. Your customized artwork consists of "objects" of variable shape, size, and color on a multicolored, pulsing background. The package comes with 105 previously designed sets of objects and backgrounds that are used in building customized screen savers. These sets can be manipulated by changing colors and textures on both background and foreground objects. The result is a piece of personal artwork decorating your computer screen. The program design and setup can be a little confusing, but the on-screen tutorial is informative and easy-to-use. The only disappointment is the objects' lack of motion.

If your own graphics artwork isn't personal enough, use photographs to create a screen saver. Several companies will take your favorite pictures and send you a diskette containing a photo screen saver. For example,

Fishpot Images produces *PC Portraits*, a program that uses scanned images as a screen saver. The package comes with five free photo scans, with each additional photo scan costing \$1.99. The customer sends in the photos, and *Fishpot Images* returns a diskette with the scanned photos and the *PC Portraits* software. Once you've got the *PC Portraits* software, you can scan in an unlimited number of your own photographs or other images.

Personalize It from Personal Screen Saver also loads your pictures onto a screen saver program. *Personalize It* is slightly more expensive at \$24.95 for one photo and software and \$5.95 for each additional picture.

The chummy *Microsoft Bob*, which works with Windows 3.1 or 95, lets you create your own operating environment by manipulating the interface to suit your particular tastes. *Bob* comes with a Calendar, Letter Writer, CheckBook, Address Book, E-mail, Financial Guide, Household Manager, and a copy of *GeoSafari*, all packaged as icons in a decorative, "homey" setting like a sitting room or an office. Beginners can get help with the new surroundings by choosing one of 12 animated "guides" to provide tips. Most of the guides are animals with personalities ranging from sweet and helpful to almost rude.

In addition to using the applications packaged with *Bob*, you can set up access to additional programs from the hard drive through *Bob*-related icons. *Bob* can serve as the primary interface, providing access to any program with an icon in *Bob's* rooms. Although the interface can be slightly entertaining and even helpful for the beginning user, once you've graduated to a more PC-savvy level, you'll probably want to say goodbye to *Bob*. It requires a minimum of eight megabytes (MB) of RAM and took up approximately 25MB of

hard drive space on our machine, making it a rather storage-intensive little trinket to keep just for kicks.

If you're a frequent DOS user, one way to make your computer a little more your own is by customizing your C> prompt. You can program the prompt to display anything from a simple line of text to the current date and time (see sidebar on next page).

Windows users can utilize the tools provided in Control Panel to change the colors on the desktop, attach sounds to system events, or use bit maps as wallpaper in the background. To get to the wallpaper decoration in Windows 3.x, open the Main group in the Program Manager, open Control Panel, and select Desktop. In Win95, left-click the Start button, choose Settings, and select Display.

The sound. Attaching sounds to system events is one way to simulate interaction with your computer. It won't exactly have a conversation with you, but it can manage a friendly greeting. (A system event is a function such as opening an application or exiting Windows.) If there are no sound files on your system or those available don't suit your needs, you can import new ones from other applications or from the World Wide Web. The sound files used by Windows 3.x and Win95 are .WAV files, a particular format of sound file. Attach sounds to system events by opening Control Panel and selecting the Sounds option.

One third-party sound option is to purchase a prepackaged bundle of sounds. *KaBoom!* by Nova Development put together 1,000 sounds in .WAV format on a CD-ROM for use on your PC. In addition to software, there are several Web sites, such as The Movie Sounds Page (<http://www.moviesounds.com>), that invite users to download their sounds. Two other good sites where you can look for sounds are <http://infinity.resnet.cornell.edu/chuck/sounds.html> and http://www.yahoo.com/Computers_and_Internet/Multi-media/Sound. The second one is a Yahoo! site that lists a number of sites with different kinds of sounds.

Once you've downloaded a .WAV file, simply assign it to a system event as you would any pre-installed sound file.

Users with multimedia computers and microphones can make this option a little more personal by recording their own sound files and using them accordingly. The system event sounds will be effective only with a system that supports sound with both software and external means of emission such as speakers or a headphone jack.

■ Landscaping

Every well-cared-for structure needs equally manicured terrain. From input devices to peripheral accessories, your desktop landscaping can help separate you from the crowd.

Input devices. The GyroPoint mouse works in two ways: It moves across your desk like a regular mouse, and it works like an odd-shaped video game pistol you hold in your hand. The deskless option works by turning the mouse on its side to orient the internal gyroscope, pointing it at the monitor, and holding down a button to move the pointer around. You can sit back, relax, and maneuver around the screen from a reclined position

without making the awkward stretch to reach for the mouse. The GyroPoint is a good idea that still needs a little fine-tuning. Its sensitive nature doesn't always work in its favor. With only a slightly shaky hand, the GyroPoint is difficult to hold on fine points long enough to make the click. Although kicking back in your chair is relaxing, keeping both hands on the mouse in an effort to keep the on-screen pointer steady is not.

The Kensington Expert Mouse trackball uses a trackball the size of a pool ball and is billed as the "customizable trackball." Kensington offers three alternate looks for the actual trackball—two alternate colors or an eight ball for pool sharks. In addition to the aesthetic options Kensington provides, Expert Mouse has four programmable keys that let users customize the way the pointing device works as well as the way it looks.

Though GyroPoint and Expert Mouse are innovative, their unique qualities are designed to enhance the pointing device's usefulness. Some of the more odd products are designed simply for creativity and individuality. The Mouseburger, for example, is a conversation piece. Somewhere between a

peripheral and a snack, the Mouseburger looks like an odd Big Mac with a cord. This pointing device is OK as a regular mouse, but it's excellent as a conversation starter.

Don't count on your novelty mouse to be your primary input device. Keep a boring standby on hand just in case. Some of the more outrageous designs of mice created for novelty rather than practicality might be more difficult to maneuver.

Pointing devices aren't the only input devices remodeling their looks. Keyboard manufacturers are taking strides to make the desk space their products consume more productive and fun. While their ergonomic and multimedia inventions have practical features, they also have interesting new looks.

The Microsoft Natural Keyboard manipulates the old standard in an attempt to keep the wrist in the gentle slope of the recommended working position. The result is a curving keyboard that looks like something from a Dali painting.



ChromaZone from Gibson Research Corp. provides the tools to create your own graphical screen saver.



Tool or tasty treat? Unipac Corp.'s Mouseburger is, if nothing else, an excellent desktop conversation piece.

The Kinesis keyboard breaks free from the old typewriter-based board altogether. The QWERTY key order (the typewriter standard named for the order of letter keys in the upper-left corner) is about the only aspect of this keyboard that appears at all familiar. The keys are divided between the two hands and arranged in rows in depressions in the upper corners.

Multimedia keyboards incorporate sound into the basic keyboard mode, including speakers, a microphone, and a headphone outlet.

There are several keyboards designed for children. KidTech produces one called My First Keyboard, which is a complete one-piece unit with no cracks or crevices waiting to accommodate youngsters' spilled snacks. My First Keyboard is appropriate for young children who are just learning to play, but the format arranges the letter keys in only two rows, not the QWERTY we learn to type on.

Desktop accessories. Now that you've lived up the functional aspects of your machine, your workstation might look a little boring. Remember, however, that while computer accessories might add a little sparkle to your work environment, the annoyance level of some may not be worth the decorative value.

If you have trouble finding space for photographs of your loved ones, try keeping the photo on something that's already on your desk. You can, for example, use your own photographs to personalize the surface your mouse runs on. Companies such as Personal Mouse Kit in Delta, Colo., can take pictures and use them to create a mouse pad.

Cybercalifragilistic Accessory Kits are fully coordinated desktop packages in three themes: Star Trek: The Next Generation, Flintstones, and Nickelodeon. An accessory kit includes a specialty keyboard, mouse pad, monitor mask (a decorative, cut-out frame that attaches to the monitor), mouse, and diskette holder. The accessories are true to their themes. For example, the Flintstones kit includes a mouse pad shaped like Fred's shirt and tie and a mouse shaped like a turtle shell.

While some of these products will help make your PC a little more user friendly, the only way to make your computer/workstation truly your own is to use your imagination and creative innovations to design an area that can't be duplicated. ●

by Elizabeth Parska

Peculiar Prompts

To use text for your C> prompt, simply type prompt and the text you want to appear. The result will be your requested line of text hanging in the prompt's position. For example, typing prompt Novice will produce a prompt that displays as Novice. In addition to text, certain symbols will produce the date, time, or symbols. Additional commands and their functions are listed below. The new prompt may look a little different, but it still functions just like the old standby. Type your commands as you would at the familiar C>.

To change your prompt back to the original C>, type prompt, and press ENTER. Using the PROMPT command at your C> prompt will hold your customized prompt as long as your computer maintains power or until you change the prompt again. Once you restart your computer, the hard drive prompt will return to a C>.

You can make the customized prompt line a permanent fixture by adding a line to the Autoexec.bat file. Type the command line you used at the C> prompt in your Autoexec.bat file. This line can go at the beginning, end, or anywhere in between. If you add a new prompt line to the Autoexec.bat, the prompt won't change until you restart the computer. The customized prompt will be present both at the regular DOS prompt and the DOS prompt inside Windows.

These functions will elicit a particular prompt:

- \$B** displays the backslash (\)
- \$D** displays the date
- \$E** displays the left arrow
- \$G** displays the greater than symbol (>)
- \$H** executes a backspace
- \$L** displays the less than symbol (<)
- \$N** displays the active drive
- \$S** displays a space
- \$T** displays the time
- \$V** displays the DOS version being used ●

For More Information:

Cybercalifragilistic Accessory Kits

\$125
(954) 989-3338

ChromaZone

\$24.95
Gibson Research Corp.
(714) 348-7100

Ergonomic Keyboard

\$275
Kinesis
(800) 454-6374
(206) 402-8100

Expert Mouse

\$99
Kensington
(800) 535-4242
(415) 572-2700

Gyropoint Desk

\$149
Cyratation Inc.
(800) 316-5432
(408) 255-3016

KaBoom! (sound package)

\$34.99
Nova Development
(800) 395-6682
(818) 591-9600

Microsoft Bob

\$54.95
Microsoft Corp.
(800) 426-9400
(206) 635-7044

Microsoft Natural Keyboard

\$99.95
Microsoft Corp.
(800) 426-9400
(206) 882-8080

Mousburger

\$25
Unipac Corp.
(800) 2GO-MICE
(708) 231-6030

My First Keyboard

\$79
KidTech
(800) 367-7080
(609) 627-6800

PC Portraits

\$29.95
Fishpot Images
(800) 405-0036
(314) 225-6376

Personal Mouse Kit

\$9.95
(800) 458-9474
(970) 874-4866

Personalize It

\$24.95
(\$5.95 for additional photos)
Personal Screen Images
(800) PC-VIEWS
(916) 961-9773

ZW 104

Keyboard
\$34.95
Mitsumi
(800) MITSUMI
(214) 550-7300



Making The Link Between PCs And Telephones

Computer telephony is more than just a fancy term that means turning your computer into an oversized, expensive answering machine. It is a little more complicated—and a lot more interesting—than that. Computer telephony is a fast-growing technology that combines the power of computers with the utility of phones to help people better utilize both tools.

More people have become interested in the possibilities of computer telephony as large computer companies such as IBM and Compaq have introduced home computer models with some basic telephony capabilities. The computer telephony industry itself is exploding as more and more companies join in, creating new software and hardware at a dizzying pace. With all the options available, anyone buying a new PC or adding on to an existing machine should know a bit about the basic features of telephony, the industry springing up around it, and what you can expect to pay for products.

■ Stupid Phones, Smart PCs

To understand why we need telephony, you must realize that the average phone is just plain stupid. That's the opinion of Harry Newton, who knows a thing or two about phones. Newton is the editor-in-chief of the magazines *Computer Telephony*, *Teleconnect*, and *Call Center* and is one of computer telephony's greatest proponents. He even came up with the phrase.

Newton can overwhelm you with examples of the phone's stupidity. Here's the short list: It doesn't have a backspace key, the keypad is upside down, it won't let him program a pause, the speakerphone quality is bad, it costs too much money, and it does too little. One of the most telling phrases he has heard, uttered in offices throughout the world, is "I'm going to try to transfer you, but if we get cut off..."

Computer telephony will change all of that, Newton says.

"Computer telephony applies computer intelligence to the making and receiving of

phone calls," he says. By combining the necessary but lowly phone with its brainy desktop partner, the computer, people really can change the way they communicate.

"With some software and a board you can drop into your PC, you can create the most productive piece of telecommunications gear you could have ever imagined," Newton says. "Suddenly, for \$250 in the home or small office, you can do substantially better than a \$750 business phone."

■ A Booming Business

One reason computer telephony is taking off—and becoming more affordable—is because so many companies are jumping on the bandwagon and developing software and hardware products.

When we spoke to Newton, he was preparing to be one of the main speakers at the industry's biggest conference of the year, Computer Telephony Expo '96, which was held in March in Los Angeles. The conference's

growth appears to be mirroring that of the industry itself. Newton says there were 67 exhibitors at the show in 1991. There were more than 400 booths planned for this year's convention. The square footage of the convention's show floor, held this year at the Los Angeles Convention Center, is at least 120% larger than last year's.

According to Newton's *Computer Telephony* magazine, computer telephony is a \$3.5 billion, 30%-growth-a-year industry with some areas growing at an incredible 100%. *Computer Reseller News* reported in August 1995 that the market research firm Dataquest predicts the computer telephony industry will reach almost \$7.4 billion by 1999.

One major factor involved in the increasing number of companies and new products is the standards that have come into place in the last year. At first, as with most new technologies, companies created products that were all over the place, each requiring a different set of installation instructions, a good chunk of patience, and a little luck. Now two major standards, TAPI and TSAPI, make using computer telephony easier than ever.

Microsoft and Intel created **Telephony Application Programming Interface (TAPI)**, the communications interface that lets an average desktop computer and a telephone work together. Microsoft's Windows 95 supports TAPI, which means computer users with that operating system should find it relatively easy to hook up computer telephony software and hardware that follows the TAPI standard.

Telephony Services Application Programming Interface (TSAPI), created by AT&T and Novell, is the other major standard. TSAPI is the standard for connecting telephones to computers on a network.

With these two standards in place, it's much easier for software and hardware manufacturers to move forward with their telephony ideas. And it's easier for the home or small business computer user to become involved.

In addition to the advances brought about through TAPI and TSAPI, Newton says computer telephony is flourishing also because people have waited a long time for another step forward in personal communications. He sees computer telephony as the first major



**Even
elementary
telephony
packages offer
features that make
you want to toss
your old
answering machine
in the closet.**

advance since the introduction of regular voice mail more than 10 years ago.

"The telephone has become, to most people, a gigantic time waster," he says. About three quarters of all calls into corporations, he says, end in an impersonal voice mail message that can be highly irritating to callers.

Computer telephony might not always be able to keep calls from ending in voice mail, but it should help make any telephone system more user-friendly—and smarter—on both sides of the call.

■ The Basics

Even elementary computer telephony packages offer features that make you want to toss your old answering machine in the closet. You can find packages that act as a no-frills voice mail center, or you can go high-tech with a setup that can read an incoming call, access your customer information database, and deliver a profile of the caller to your screen before you've even had time to say "Hello." It all depends upon what you

want, what you have, and how much you're willing to spend.

The most basic feature of any computer telephony package is the voice mail, which answers your telephone and takes messages while you are away. Most telephony voice mail packages, however, offer a few more options than the typical telephone company voice mail service. With computer telephony voice mail, you easily can customize your program and messages to deliver individualized statements to a number of different people.

That means if a customer calls your home-based business, he can be directed to one message, and if your mother calls you there to talk to her grandchildren, the system can direct her to another message. You can avoid the boring, impersonal, one-size-fits-all limitations of regular answering machines and make each person's call more pleasant. Most computer telephony programs make it easy to personalize a number of voice mail messages.

Another feature of most computer telephony packages that can be a big draw to the home or business user is the on-screen message center. This lets you look at the messages your computer has received before you listen to them. If you have caller identification (now available in most areas of the United States), you can see who left messages and pick the ones you need to listen to first, instead of listening to every message, one after the other. If you're expecting an important call, you can call up the message log screen and check whether that specific call came in while you were away. If it's there, you can go directly to it, listen to it, and save the rest of your messages for later.

Some packages' message logs even can round up all of your incoming communications so you can see everything at once. You can check your voice, fax, E-mail, and pager communications in one place. It could make keeping track of who called you and when they did it much easier.

Auto dialers are also pretty standard in most packages. After entering all your important phone numbers into the system or connecting your new software to your own customer database, it takes only a mouse-click to place a phone call. Some systems even will enter a new contact's name and number automatically while you are still talking to them on the phone. This means no

more whirling through your card file, searching for lost sticky notes, or calling up a phone number on your screen only to have to dial it in by hand.

■ Hardware And Extras

The most basic piece of hardware that comes with any computer telephony package is the modem. A modem and phone line give you the ability to send and receive data. Most modems operate at one of two speeds: 14.4 kilobits per second (Kbps) or the faster 28.8Kbps. With a modem and the right software (often included with computer telephony packages), you also can join the world of computer faxing, Internet surfing, World Wide Web browsing, and E-mail sending.

Another feature included in many computer telephony packages is a full-duplex speakerphone. A number of companies offer this feature, which is more convenient than the average half-duplex speakerphone that comes with most office telephones. A speakerphone lets you speak into a microphone and hear the other person through your computer's speakers. It lets you have a regular, hands-free conversation, so you can keep working at your computer. A full-duplex speakerphone lets both parties speak at once as on a regular phone instead of the stop-and-go, walkie-talkie speech patterns necessary on a half-duplex.

Some computer telephony packages take on the additional hardware role of a sound card, providing the sound for the rest of your computer. Having your sound card, full-duplex speakerphone, and modem all in one card can save you space and hassle when it comes time to take the top off your computer.

Many computer telephony packages out there already are moving well beyond simple voice mail and speakerphone capabilities. Some programs can do everything from informational screen pops (on-screen windows that appear automatically to provide information) to automatic call forwarding and voice recognition. These programs can cost more than the basic packages, and you should always

check to make sure they still cover the simple functions, such as voice mail, and include all the necessary hardware, such as a modem.

■ Technology vs. Practicality

Just a note before launching into our products list. While all the new technology involved in computer telephony may sound intriguing, we should point out that it really isn't for everyone—at least not yet.

While the price of the technology continues to drop, a basic computer telephony package still will end up costing more than a standard answering machine. So if all you really need is something that will let your friends and family leave the occasional phone message, you probably shouldn't spend the cash for a telephony package.

Before hopping in your car and rushing to the computer store, consider the potential drawbacks of computer telephony. First, many (but not all) computer telephony packages require you to leave your machine turned on if you want the voice mail to work. So if you want voice mail 24 hours a day, your machine must be running all the time. Experts continue to debate whether leaving a computer on all the time is better or worse than turning it on and off. Even if wear and tear on your computer aren't a concern, you should still consider how much electricity you'll need to keep your computer constantly running. If you have an energy-efficient computer, you might not be

using any more than you would with an answering machine. If you have a power-hungry machine, however, thoughts of growing electricity bills might make this decision easy for you.

Second, most computer telephony packages don't require a top-of-the-line computer to run, but they do use some hard drive space to record your messages. Most don't require much at all, but if storage is already a problem on your machine, you could run into more trouble.

With all that said, we think a good telephony program could go a long way toward building a stronger professional image for a small or home-based business. It also could be great for increasing customer satisfaction.

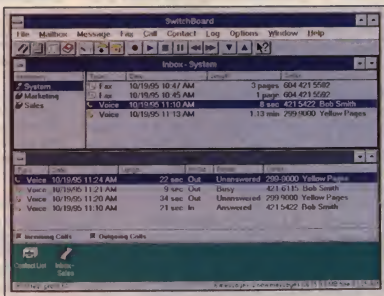
■ The List

We've gathered information on a number of computer telephony products and companies we ran across while researching the topic on the Internet and through other sources. This isn't a review, just a short list of some of the products that are out there and some of the functions the manufacturers claim they offer. We included a few products that cover the basics and a few that showcase some of computer telephony's more interesting capabilities. We focused on the desktop-oriented systems rather than the network-based packages, and we didn't list all the features of every product.

Because most of these products are so new, most of the companies couldn't provide us with customer contacts to talk to about using the products. We recommend you contact the individual companies, or visit their Web sites, if you have questions about a package.

Prometheus Products' CyberPhone. Newton plugged this telephony package himself, saying his editor at *Computer Telephony* installed it and hasn't picked up his regular phone since.

The CyberPhone comes complete with all the software (called *CyberWorks*) and hardware the average computer user needs to set up a basic telecommunications



Unified inboxes, such as this one in Spectrum's SwitchBoard software, let users assemble fax and voice messages in one location on the system and review them in any order.

center. Features include a high-speed fax/modem (available in external or internal models at speeds of 14.4Kbps or 28.8Kbps), a voice mail system with 99 mailboxes, a full-duplex speakerphone (including the microphone), a message log with caller identification features, and remote access capabilities. The CyberPhone's internal modems are Plug-and-Play and compatible with Radish VoiceView, which makes it possible to transmit data and graphics within a voice call. The estimated street price for the 14.4Kbps CyberPhone is

with a 14.4Kbps modem and a cost of about \$99. The V.34 Office F/X, a full-featured package that includes Spectrum's DSP (Digital Signal Processing) technology; SoundBlaster Pro compatibility with 16-bit, CD-quality wavetable sound; and a 28.8Kbps modem for about \$299.

Clearwave Communications. Clearwave's Intellect-ID features include incoming call notification, a universal phone book that automatically records new contacts, a speed dialer, links to database software, and a special "do not disturb" feature that collects

ways to organize the tools in a convenient and affordable package for business and home users.

Still, Newton is typically enthusiastic about what could happen in the next few years. He talks, for example, about screen pops that appear at the beginning of a call to ask if you would like the conversation recorded and at the end to ask if you would like it transcribed.

"We are talking, literally, about a major revolution in terms of the way people use phones," Newton says. "We are talking about a major change in the way telephones will work in the next five years." ●

"We're talking, literally, about a major revolution in terms of the way people use phones."

**— Harry Newton,
computer telephony advocate**

by Tom Mainelli

For More Information:

Audio Telephony 2000
Aztech Labs
(800) 886-8859
(510) 623-8988
<http://www.aztech.com.sg/>

CyberPhone
Prometheus Products
(800) 477-3473
(503) 692-9600
http://www.netusa.com/pcsoft/library/p_902.htm

Envoy II, V.34 Office F/X
Spectrum Signal Processing
(800) 667-0018
(206) 883-0748
<http://www.spectrumsignal.bc.ca>

Intellect ID, Intellect IQ
Clearwave Communications
(800) 414-9283
(970) 223-3873
<http://www.clearwave.com>

Phonetastic
SoftTalk
(617) 433-0800
<http://www.softtalk.com/>

VM100, VM500 Decathlon XL, PM800
Reveal Computer Products
(800) REVEAL-1 (738-3251)
(818) 704-6300
<http://www2.pcy.mci.net/marketplace/reveal/>

\$59, and the 28.8Kbps model (internal) will cost you about \$189. Add about \$10 extra for an external version of the 28.8Kbps unit.

Aztech Labs' Audio Telephony 2000. The Audio Telephony 2000 offers the standard features of a computer telephony system—message log, voice and fax forwarding, 14.4Kbps fax/modem, full-duplex speakerphone—as well as a 16-bit sound card. The addition of the SoundBlaster-compatible sound board makes it possible to play CDs in your CD-ROM drive for callers who are on hold. This system sells for about \$179.

Reveal Computer Products. Reveal offers several computer telephony products. The company's VM100 Telesound product offers a nine-mailbox system with a full-duplex speakerphone for about \$50. The VM500 Decathlon XL offers a speakerphone, voice mailboxes, a 14.4Kbps modem with fax capabilities, a SoundBlaster-compatible sound card, and a voice-activated calling feature that lets you tell the computer who you want it to call. The XL sells for about \$229. Reveal also offers the PM800, a basic computer telephony package with a 28.8Kbps modem, for about \$199.

Spectrum Signal Processing. Signal offers a number of telephony products that cover the range of functions and costs. The Envoy II fulfills the basic computer telephony functions

user data without ringing to your phone.

Intellect ID's big brother is the Intellect IQ, which, in addition to the features named above, offers priority call alert, call transfer, and conference abilities. It even works if your computer isn't running. The Intellect ID costs about \$150, and the Intellect IQ costs about \$330.

SoftTalk's Phonetastic. One of Phonetastic's more interesting attributes—in addition to its regular computer telephony capabilities—is that it lets you decide how the software will interact with your current databases and phone system. You set up the software's "rule engine" to a series of rule-based variables and conditions. Essentially, you can tell it the best way to do its job. Phonetastic sells for about \$199.

■ Future Possibilities

As we mentioned, the products and abilities we've discussed here are only a part of the big picture. The computer telephony industry continues to produce increasing numbers of new products, and the possibilities really are pretty endless.

For many of the promising developments, Newton says, the main challenge is finding



Kid Friendly Computer Accessories Designed in Fun Colors

Why can't kids have computer accessories too? For the family, the children's need to use a computer is a major motivating factor in purchasing a PC. Kids need a PC for doing homework, and to explore new learning activities.

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accessories in fun, distinct colors and have even created fun animal stickers to add personality to each disk storage item. What can be more fun?

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- Teaches responsibility by storing and protecting their own disks and CD ROMs
- A natural complement to the PC purchase and purchase of "Kidware" software.

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PageMaker 6.0

For Windows 95: Part III



Thanks to desktop publishing software such as *Adobe PageMaker 6.0 for Windows 95*, designing appealing documents is no longer difficult or tedious. This month, we will show you how to create and edit tables. *Adobe Table 2.5*, the table editor bundled with *PageMaker*, is not perfect, but it beats using a word processor's TAB function to arrange data into rows and columns.

Adobe Table is well-suited to create attractively designed tables for company reports and other business uses, such as creating flyers for advertising sales and new stock arrivals. This table editor is especially convenient for designing single-page table layouts containing multiline entries. Text automatically wraps within each table cell when it

exceeds column width, and row height expands to accommodate cell contents.

■ The Design Process

To design *PageMaker* tables, you can either launch *Adobe Table* as a standalone utility from the Start menu or work with it directly in *PageMaker*. A table created in standalone mode can be exported as a text-only or graphic file. To do this, go to *Adobe Table*'s File menu, select Export, then select either the Text or Graphic option. Tables imported as graphics (go to *PageMaker*'s File menu, select Place) retain the original design. You can manipulate them like other images, but cell contents

cannot be modified easily. Any table can be exported as either a Windows Metafile (.WMF) or Enhanced Metafile (.EMF) graphic, but there are problems with .EMF. Text in a table saved as an .EMF file appears 10% smaller when imported into *PageMaker*. To avoid this, save the file as a .WMF graphic.

Tables imported as text into *PageMaker* lose stylish borders, fills, and text attributes applied to them during design, but their contents may be easily edited in *PageMaker*. Export the table as ASCII text if you expect table contents to cover more than one page. *PageMaker* doesn't know how to break a graphic object onto separate pages.

As long as your computer has enough random-access memory (RAM) to run both *PageMaker* and *Adobe Table* simultaneously, working with the table editor from within

PageMaker is the preferred method for table design because editing is much easier. A table created with *Adobe Table* directly in *PageMaker* is managed through object linking and embedding (OLE), which is a method to transfer and share information among applications. *PageMaker* functions as the OLE "container;" *Adobe Table* operates as the OLE "server."

To change table contents, select the Pointer tool from *PageMaker*'s Toolbox palette, then double left-click anywhere on the table object to launch *Adobe Table*. You're ready to edit. While tables and changes created this way appear automatically in *PageMaker*, remember to save your *PageMaker* document; *PageMaker* does not automatically save documents.

An OLE table created this way exists only within the *PageMaker* document. There is no other copy of it on your hard drive, unless you choose "Save copy as" from the table editor's File menu and expressly save the object to the hard drive. Once it's saved on a hard drive, changes made to a table created in *Adobe*

Table no longer are updated in PageMaker. To ensure that your table continues to be updated in PageMaker, exit the Table application after saving to the drive, then use the PageMaker pointer tool to double left-click on the Table object in the PageMaker document to reactivate the original link.

■ Creating A Table

This tutorial guides you through producing a menu of items and prices for "Incredible Edibles," a restaurant specializing in delectable lunches. You will modify the layout of the four-page brochure created in last month's PageMaker 6.0 tutorial. (See the May 1996 PC Novice, page 48.) As in last month's tutorial, this brochure design uses PageMaker's "Build Booklet Plug-in" (found under the Utilities menu) to create a multipage layout in which pages on 5.5-inch by 8.5-inch paper are paired (2-up) to be printed on a single sheet of paper.

The Build Booklet Plug-in prints pages back-to-front if your printer supports double-sided (duplex) printing, outputting the first page of the brochure on the same sheet as the last page. The second brochure page prints on the same sheet as the second-to-last page. Pages automatically print in proper order. All you have to do is fold the completed double-sided sheet in half. If your printer is not equipped with duplex capabilities, print the first page, remove it from the printer, flip it over, then reverse the position in the printer sheet cassette. Next, direct PageMaker to print side 2. You may have to practice a few times to ensure both pages print back-to-back with correct orientation.

Go to PageMaker's File menu, select Open, then choose Mybrochure.pt6 (the brochure template created in last month's issue). PageMaker automatically opens a copy of this template, rather than the original file, unless you instruct otherwise. When the document appears on-screen, go to the File menu, and select Save As. Then save it as a PageMaker document called "Menu." Since you're working in Win95, you don't have to worry about adding a three-letter extension (.PM6) to the file name; PageMaker does this for you.

With a copy of the original template on-screen:

- Go to this document's Master Pages by left-clicking page icons marked with an L and R at the bottom of the layout window. Or you can go to

Plain tables can be made more attractive with borders.



the Layout menu, choose Go to Page, select Master Page, left-click Opening Spread from the drop-down menu, then left-click OK.

- Choose 75% Size from the View option under the Layout menu if the footer for the first Master Page is too small to read.
- Left-click the scroll arrows along the bottom and right sides of the active window to bring the left Master Page footer into view.
- Choose the Text tool from Pages Toolbox palette. If the Toolbox is not visible on-screen, go to the Windows menu, and select Toolbox.
- With Text tool selected, highlight "Fly-By-Night Travel Tours" in the left Master Page

footer, type Incredible Edibles, then highlight "Summer in Paris," and type Crunchable Munchables.

- Highlight "Incredible Edibles"; press CTRL-C to copy these words to the Clipboard.
- Use the right scroll arrow to move to the right Master Page, highlight Fly-By-Night Travel Tours, then press CTRL-V to paste the words "Incredible Edibles."
- Follow the same procedure to paste the words "Crunchable Munchables" from the left Master Page to the right Master Page.
- Save your work.

You'll use Adobe Table to design the second page of this brochure with a menu containing Incredible Edible's luncheon goodies, complete with portion sizes and prices.

- Find the page where you want to place the table.
- Go to the Edit menu, and select Insert Object.
- When the Insert Object dialog appears, select Create New, highlight Adobe Table 2.5 in the Object Type list, then left-click OK.

A Table Setup dialog box is displayed that lets you specify the number of rows and columns for this table (see Figure 1). Before drawing an actual table on-screen, you should draw a rough sketch on paper to help determine how many rows and columns you need. For this tutorial, set up your practice table to have six rows and four columns. Table height and width determine overall cell height and column width. Enter 6 for height and 4 for width, then use the drop-down list to the right to set the unit of measurement to inches.

Plain tables can be made more attractive with borders. Every border can be configured with an identical line weight. Enter a value from 0 to 36 points in .1 increments in the Border Width field named "All." You also can set outside edge borders and vertical and horizontal interior lines to different line weights.

- Specify .5 for every border in the table except the vertical interior border.
- Set the line weight of the vertical interior border to "None" so it remains invisible. Experiment with different line weight settings.
- Specify 0.125 inches as the gutter values for the horizontal width

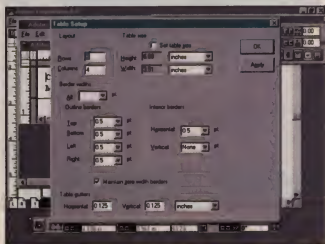


Figure 1: Adobe Table's Table Setup dialog lets you set the number of rows and columns for your table.

space between rows and vertical white space between columns.

- Every cell in the table can have its own text attributes, such as font, type size, type style, color, and leading. You will configure these values as you work.

Table settings established when launching Adobe Table can be changed as you work. For example, every data line in a table cell can have its own alignment. A cell heading can be centered, while other text in the cell can be left- or right-justified. The decimal alignment feature ensures that numbers are aligned along their decimal points. You can adjust a column's width by dragging its boundary line at the column select button or adjust row width by dragging the boundary line beneath a row select button. If you press the SHIFT key while dragging a boundary line, the size of an adjacent column or row also changes. If you prefer precise values for column and row widths and horizontal and vertical gutter spaces, go to the Window menu, select Show Table Palette, and enter values in the appropriate fields.

You can modify the text attributes of a cell's contents by going to Adobe Table's Edit menu and selecting Type and Paragraph Specs, or by making changes with the Text Attributes palette, which looks like PageMaker's Control palette. To display Adobe Table's Text Attributes palette, go to the Window menu, and select Show Text Palette. Add fills (percentages of black) to one or more table cells by selecting the cells you want to fill, choosing Show Table Palette from the Window menu, and then typing a fill percentage in 1% increments.

Additional table rows and columns may be added by choosing the appropriate command from the Cell menu. Adobe Table automatically expands table size to accommodate these changes. If your page size places constraints on table size, make sure the Set Table Size option is selected in the Table Setup dialog box found on the File menu. This command preserves table width and height when new rows or columns

are added. To reduce a row of cells to a single cell for a table title or caption, select the row or cells to be combined, go to the Cell menu, and choose Group. Type a table title.

Though Adobe Table is simple to use and easy to master, it's not robust. Unlike the table editor in Microsoft Word for Windows, for example, it doesn't allow WYSIWYG (What You See Is What You Get) editing. If you create and edit a table as an embedded OLE document within PageMaker, you work in the Table window while the actual table is displayed in the PageMaker document window (see Figure 2). If you work with Adobe Table in stand-alone mode, it won't let you export your file as an .EPS. Adobe Table has other shortcomings: you can't add numbers in a row or column or

calculate percentages; you can't fill a cell with a graphic imported from another program; and it does not support color. When table editing needs are more demanding than what Adobe Table can provide, design the table in another application, then bring it into PageMaker as a graphic or an tab-delimited text file that can be edited.

Note: To get around Adobe Table's lack of color support, select the entire table or just particular rows or columns, display the Table Attributes palette, then apply None for fill setting to the selected parts. In PageMaker, draw a box in the area where you want to apply color with the Toolbox rectangle tool. Select this box, choose Colors from the Window menu to display the Colors palette on-screen, then select a color from the palette. With the rectangle still selected, go to the Arrange menu, and select Send to Back. The color will appear behind the table, brightening the table's appearance while allowing cell contents to be displayed.

■ Electronic Publications

The PageMaker document you spent hours preparing with the right blend of text and graphics will be electronically distorted on another computer when fonts installed on the viewing system do not match typefaces installed on the originating computer. In this instance, text line lengths change, dramatically altering page layout. It's also difficult for the second computer to display a file when the originating application is not installed on its system. You can share files by having the originating application save the document as unformatted ASCII text or by using special translators to convert files to a format the second computer supports. However, fonts, graphics, colors, style, and page design all vanish in translation.

By generating application-independent files, Adobe Acrobat lets users exchange electronic documents across platforms, networks, and operating systems. This software creates .PDF (Portable Document Format) files that can be viewed, navigated, and printed on any computer with an installed copy of Acrobat. You can even use Acrobat to create files to be

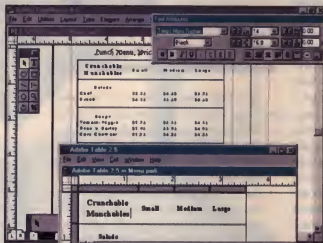


Figure 2: In Adobe Table, you create and edit a table in the Table window while the actual table is displayed in the PageMaker document window.

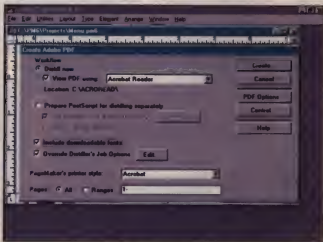


Figure 3: When generating a .PDF file of a PageMaker document using the Create PDF command, you can specify that Distiller include the downloadable printer fonts to prepare the file.

distributed on the World Wide Web. Sharing electronic .PDF files lets a Macintosh computer open them even if they were created in Windows, and vice versa. In addition, while PageMaker requires Win95 and 16 megabytes (MB) of RAM for optimum performance, a PageMaker-generated .PDF file can be opened on a Windows 3.1 machine equipped with 4MB of RAM, even if it lacks PageMaker.

Authors who produce documents for the World Wide Web should consider publishing in the .PDF format rather than HTML (Hypertext Markup Language) when files contain technical specifications and drawings because technical data and images don't always convert cleanly to HTML. HTML provides little direction over text color, typeface, and point size; PDF gives authors more precise control over what the reader sees. PDF files always look like the original document and print at the same resolution as the viewer's output device.

If you're not sure which format to use, experiment with both. Adobe bundles *Acrobat Distiller PE*, an application that converts PostScript files to .PDF files, with the Deluxe CD-ROM version of PageMaker. This application only works with PageMaker files, and it can't be used to convert PostScript files created in other applications to .PDF format. Adobe also includes *Acrobat Reader*, a .PDF viewer, with the Deluxe CD-ROM version of PageMaker. Customers who buy the diskette version of PageMaker can download a free copy of Acrobat Reader from Adobe's Web site at <http://www.adobe.com>. Any .PDF file can be distributed with a copy of Acrobat Reader.

The HTML Author Plug-in, available from PageMaker's Plug-ins list on the Utilities menu, creates HTML formatted pages for uploading onto the Web. It supports a subset of HTML 2.0 style tags. A newer, updated HTML Author plug-in, bundled with the Adobe PageMaker Enhancement Pack for Windows 3.1 and Win95, should be available soon, and it will be sent free to all registered owners of PageMaker software. It lets you apply a graphic background to a Web page and select and launch your favorite Web browser when viewing HTML files produced with PageMaker software.

■ Creating a .PDF Document

Creating a .PDF file in PageMaker is like preparing a document to be printed. Once your layout is finished and you have checked for spelling errors in Edit Story mode, go to the

Configuring Your Browser To Work With Acrobat Reader

World Wide Web browser applications such as *Netscape Navigator* 2.0 generally do not read .PDF formats directly. Follow these steps to configure *Acrobat Reader* as an external viewer or "Helper" application for Netscape Navigator so Navigator opens a PageMaker .PDF file in Acrobat Reader after retrieving it.

- Launch Netscape Navigator.
- Go to the Options menu; select General Preferences.
- Left-click the Helpers tab.
- Left-click the Create New Type button. When the Configure New Mime Type dialog box appears, type **application** in the Mime Type field and **pdf** in the Mime SubType field.
- Left-click OK.
- Type **pdf** in the File Extensions field.
- Select the action Acrobat Reader executes when it encounters the file, such as "Unknown: Prompt User" to notify you of further action or "Launch the Application" to open the file with Reader. If you select "Launch the Application," use the Browse button to locate Acrobat Reader. Instructions for installing Acrobat Reader with other popular browsers can be downloaded from the Adobe Web site at <http://www.adobe.com>. ●

File menu, and choose Create Adobe PDF, then follow on-screen prompts to generate the file. You must have Acrobat Distiller PE 2.1 for this to work.

It takes some extra work if you want to electronically distribute a PageMaker file with multiple page-numbering systems, such as Roman numerals for a Table of Contents and Arabic numerals for other text. .PDF documents do not support multiple page-numbering systems; they always begin with Page 1. There's no simple solution. You must convert the PageMaker document to one numbering system before putting it into .PDF format.

To create a .PDF document with cross-references or hypertext links providing readers with an easy-to-navigate structure, be sure the PageMaker file has a Table of Contents or an Index produced with the Create Index or Create TOC commands found on the Utilities menu. Manually produced Tables of Contents and Indices do not produce hypertext links. With a properly formatted Table of Contents and Index, PageMaker inserts a marker in front of each entry and page reference. You can see these markers in Edit Story when the Display Paragraph marker on the Story menu is checked. Viewers who left-click on a page number reference in the .PDF file will jump automatically to the document page containing that reference. By default, Distiller creates an Acrobat bookmark for each entry in the Table of Contents. An "Edit names" option (adjacent to the Create Bookmarks checkbox in the PDF Options dialog box) lets you edit bookmark names created from Table of Contents entries.

If you want instructions or an introduction to appear on the first page, go to the PDF Options dialog box, and select "Add Note to first page," then type the message in the Note pop-up window. You can have Acrobat display this note in an open Window or as a note icon. If you choose "Closed," the default setting, readers must double left-click the note icon to display note contents.

When you create a .PDF file of a PageMaker document, you can specify that Distiller include the downloadable printer fonts used to prepare the file (see Figure 3 on previous page). This ensures that character leading and spacing display are as intended and that original fonts are included in the PostScript file output to a PostScript printer. This is important if you are using non-alphanumeric typefaces such as Symbol or Wingdings. Including downloadable fonts substantially increases the size of an electronic file, making it difficult to save it to a single diskette. If you want PageMaker to display the .PDF file immediately after generating it, check the box marked "View PDF using:" in the Create Adobe PDF dialog box, then specify a viewer (such as Acrobat Reader) from the drop-down menu. Distiller creates the .PDF in the same location as the PageMaker document, using the same name as the .PM6 document, but attaching .PDF rather than a .PM6 extension. ●

by Carol S. Holtzberg, Ph.D.

The Internet Goes To Work

Creating Small-Office Intranets

While the Internet gets all the press, its relatively quiet lowercase counterpart is sweeping through offices around the world. Corporations are finding intranets—internal networks using the same protocols and tools as the global 'Net—are inexpensive, easy ways to link employees together and share information like never before.

An office intranet works like a tiny version of its worldwide namesake. Users ply through documents, directories, and forms using World Wide Web browsing programs such as *Netscape Navigator*. Hyperlinked words and graphics bring up different information with every click of the mouse. There is no fumbling through directory trees or searching shared folders for the correct document. A well-planned intranet web is easy enough for employees to use from day one.

Best of all, intranets require no expensive, proprietary groupware with steep learning curves and limited lifespans. Along with readily available tools for E-mail, file transfer, and online conferencing, intranets can use many of the other exciting new technologies developed for the Internet. Some Internet applications, such as video and audio, actually work better on intranets thanks to their higher data transfer speeds.

Brian Sankey, national sales manager for O'Reilly and Associates' software group, says the openness of the intranet standard lets companies take advantage of all these tools without going down the proprietary path. Because the Internet isn't going to close up shop next year and leave customers stranded, "Everyone sees a safe harbor in the intranet solution," Sankey says.

Office workers have long been communicating using other types of computer networks, but the intranet system's ease of use is

fast making converts. After learning one application, the Web browser, employees can call up vacation request forms, look at the contents of a constantly changing network drive, query a cryptic database with easy-to-use fill-in-the-blank forms, check schedules of co-workers, or read the latest information on company benefits. Virtually any information an employee needs can be built into hyperlinked, logically arranged web pages.

■ Evolving Offices

Sankey sees intranets as just the latest development in the evolution of office communications. Voice mail, E-mail, and intranets all can perform the same types of tasks, he says, but an intranet allows more flexibility.

"A lot of the information that you broadcast (through E-mail) could be handled within a well-constructed internal web," he says. For

instance, instead of a manager sending a group of subordinates E-mail about his daily schedule, the details could be posted on a web page accessible to employees.

New software tools make it nearly as easy for web users to create this kind of content as it is to view it. Microsoft's *Internet Assistants for Word, Excel, and PowerPoint* let users of these three programs transform documents, spreadsheets, and presentations into the Web's Hypertext Markup Language (HTML) format with the touch of a button. Similar tools are available, usually for free on the Internet, for *WordPerfect* and other common office programs. As these software solutions emerge, intranet momentum picks up speed.

Sankey's work takes him to companies around the country where he sees intranets being put into action. He says the concept is hottest right now in human resources departments. Owens-Corning, Apple Computer, and Oracle are some of the many firms where HR-related documents are published on intranets, he says. Other companies use intranets as a way to build inexpensive wide-area networks (WANs). Because intranets use the same protocols as the Internet, a separate leased-line system just for the intranet is not necessary for linking offices across town or around the world. All that is needed is a decent connection to the nearest Internet service provider.

Such advantages, along with increasing press coverage, have the software industry ramping up for major intranet growth. Zona Research of Redwood City, Calif., estimates intranet applications will be a \$1.2 billion industry by 1997. Groupware makers such as Lotus are rushing to make their packages intranet-aware so they don't become obsolete. The next version of Microsoft's popular *Internet Explorer* will work hand-in-hand with Word to open and edit HTML and Word documents in the same window with Word



toolbars. Perhaps most interesting, Microsoft is testing software that will allow the Windows 95 and Windows NT operating systems to act as individual web servers. With such a setup, any files or directories a user desires can be made accessible to co-workers' Web browsers.

The best way to get a taste of what an intranet can do in a specific setting is to create a small system over an existing network. We experimented with two small intranet setups: The first "pseudo-net" uses nothing more than widely available Web browsing software and requires no knowledge of networks. The second, more full-fledged intranet is a bit more demanding and adds a host of potential tools and uses.

The simplest intranet is basically a group of previously networked computers sharing at least one common hard drive. Browsers made to open documents with the URL (universal resource locator) addresses that identify sites on the 'Net can just as easily open local HTML files stored on the shared drive. Hyperlinks in these common HTML files would work just as they do on the Web, letting employees click on words to navigate easily through company information.

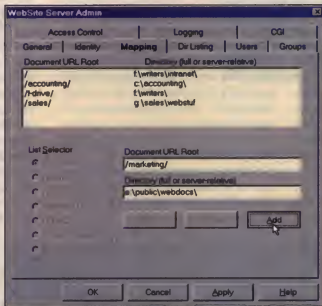
This approach works well for HR-related documents and other static displays that don't need interactive forms or links to databases. Benefit policies, job postings, vacation schedules, and the like could be updated by HR personnel and made available immediately to the rest of the company. Searching isn't an option with this simple web, but all of the documents could be organized on a series of index pages.

Most of these materials in most companies probably already exist in electronic form somewhere on the system. Using Word's Internet Assistant or other HTML editors, it's easy to turn standard files into hyperlinked web pages. Once the small web's hyperlinks were constructed, updating a document would be as simple as editing it in any word processor.

■ The Server Solution

This browser-only intranet is valuable in some cases, but full intranet capability requires Web server software. A Web server gives intranets the ability to accept and return information, display current directory listings, manage users and documents, link

forms to databases, and use other tools. With a little programming knowledge or some of the latest software, Web servers can be the foundation of product ordering systems, company-wide conferencing boards, schedule clearinghouses, or anything else an organization dreams up.



Mapping lets users connect URL addresses with directory paths for easy access to documents.

Web servers communicate with browsers through the Internet's TCP/IP (Transmission Control Protocol/Internet Protocol). Many companies already have TCP/IP networks, which makes intranet installation fast and simple. Networks based on protocols such as IPX can provide a base for an intranet as well, but it will be necessary to install TCP/IP drivers.

The intranet server doesn't need to be an expensive machine running a specialized operating system. Any Win95 computer with about 16MB of RAM will work. Those with access to a Windows NT machine have more Web server software options, but several strong, easy-to-use packages are sold for use in Win95. O'Reilly's *WebSite 1.1* includes a helpfully comprehensive manual. Quarterdeck's new *WebSTAR* and Luckman Interactive's *Web Commander* are two other systems that are easy to configure and use.

We set up a small intranet for this article based on a Win95 Pentium with 16MB of RAM running first O'Reilly's \$332 *WebSite 1.1* and then Quarterdeck's \$755 *WebSTAR*. Both packages installed quickly and seemed to work well over our existing IPX network

once we installed TCP/IP protocols on each machine.

Our first task was to install TCP/IP on the Win95 server. From the Control Panel, open the Network applet. Left-click the Add button, and select Protocol. Left-click Microsoft in the left panel, then choose TCP/IP in the right panel. Left-click OK to return to the main Network window. Make sure TCP/IP appears in the installed list and that an arrow points from TCP/IP to the name of the installed network card.

Next we set the IP address of our server machine. Because our network did not previously use TCP/IP protocols, our machine was not assigned an IP address. Each computer on a TCP/IP network has an IP address for a name. To check or change an IP address in Win95, left-click the Properties button in the Network applet while the TCP/IP line is highlighted. Left-click the IP Address tab. If a number is already there, write it down. Ours was blank, so we made up a new IP address from scratch.

If a true intranet is your only plan and you don't foresee linking this system to the outside world, it

doesn't particularly matter what your IP address is. To prevent any future problems, it might be a good idea to use a number such as 192.168.0.1, a private address that doesn't exist anywhere on the 'Net. Under Subnet Mask, enter the standard 255.255.255.0.

After the IP address, the next thing to check is the computer's name. In Win95, this is found on the Identification tab of the Network box. The name of the computer will be the server's host name. When we are through, users will be able to point their browsers to this name rather than remembering the IP address. If your computer already has a name, you can just use that. We'll call ours "intranet-server."

After you left-click OK, the computer may prompt you for the Win95 installation diskettes. After the drivers are installed, the PC will restart with the correct protocols.

On our Windows for Workgroups (WFW) stations, the process of installing TCP/IP was a bit different. A TCP/IP driver diskette for WFW is available from Microsoft's FTP site at ftp.microsoft.com/softlib/mslfiles. Download the file TCP32B.exe, run it, and follow the on-screen instructions to make a diskette.

To install the drivers on a WFW machine, double-click the Windows Setup icon in the Main program group. Under the Options menu, choose Change Network Settings. Click the Drivers button, then click Add Protocol. If Microsoft TCP/IP-32 is listed, choose it. Otherwise, select Unlisted or Updated Protocol. Put the TCP/IP-32 diskette in the diskette drive, and click OK.

To configure the machine, double-click the newly installed Microsoft TCP/IP driver in the Network Drivers screen. A space for the IP address of the machine will appear. The address of each machine must be unique from all others. We based each workstation address on the server address. The first workstation was 192.168.0.2, the second 192.168.0.3, and so on. In the Subnet Mask area, fill in 255.255.255.0.

Although workstations could find the server by its IP address alone, it's easy to set up a host name file so that users don't need to worry about strange numbers. Create a text file in the C:\WINDOWS directory of each machine containing the following line of text:

192.168.0.1 intranet-server

Be sure to press ENTER after typing the line. Save the file under the name "lmhosts" with no three-letter extension.

Once all of the TCP/IP settings are configured, you can test the new network from a DOS prompt on the workstation computer. Type ping 192.168.0.1. The workstation will send a "ping" signal to the server computer. If the server computer answers, ping will return information about the speed of the answer. If ping returns "host not found" or "request timed out," something is wrong. Check the IP addresses on both machines again. Make sure the protocols were installed correctly and that the machines were rebooted to allow the new settings to take effect. Each computer should be able to ping the intranet server. If the IP works, next try pinging the host name, i.e. "ping intranet-server."

Once the TCP/IP network is up, install the Web server software on

the designated server computer. In our tests, both WebSite and WebSTAR read the existing IP addresses and host name of the server. Both programs also included sample Web pages that provided a good starting point for building our own site.

To test the server on the same machine, first make sure the server is actually running. Open a Web browser, and point it to <http://localhost/>. Pointing to the host name could cause it to load the page off the hard drive rather than through the server, which wouldn't test anything. On a workstation, you should be able to load the existing test page by pointing a browser to <http://intranetserver/> or <http://192.168.0.1>.

■ Up And Running

With the intranet operating properly, it is time to begin exploring the features of the server. Web server software isn't cheap, and while it doesn't seem to do a lot once it is

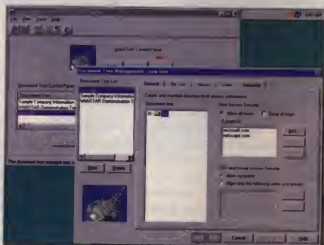
installed and working, remember that maintenance-free operation is the goal.

Server administration mainly consists of managing document trees and users. A **document tree** is basically a group of web pages usually accessible from a main HTML index. Separate document trees are unnecessary unless you assign different levels of security to different intranet areas. For example, HR material could be in one document tree with universal access. Sensitive data for a certain department could reside in another document tree protected by a password system.

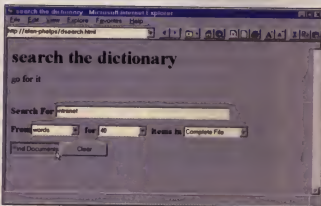
Another way of managing documents is called "mapping" in WebSite and "aliasing" in WebSTAR. Mapping is the process of assigning different URLs to directory paths. Each document accessible to a Web browser on the intranet has two addresses: the directory path and the URL. For example, the main index page for your intranet might be [Index.html](#) located in the C:\WEBSEVER\DOCS directory on the server computer. The URL for this document probably would be <http://hostname/index.html>. Users with Web browsers don't need to know what directory the main document is in; they only need enter the URL. The Web server knows where to look for the documents.

Most Web servers offer tools for managing users as well as documents. For intranets that require selectivity, Web servers usually include a mechanism to keep selected users out. With both WebSite and WebSTAR, we could specify users or groups of users and assign access privileges accordingly. When a user requests a protected URL, a password dialog box pops up. These restrictions also can be used to keep out every user lacking a certain IP address, a tool to help prevent unauthorized users from outside the company. Different users and user-groups can be denied or granted access to document trees in WebSTAR and individual URLs in WebSite.

Along with these basic tools for site management, most Web servers also support Windows Common Gateway Interface (CGI) standards. CGI is not a programming language but is a set of standardized rules for passing information from Web page



Quarterdeck's WebSTAR includes security features designed to control who can see what.



Using WebSite's included CGI programs, it's easy to set up a search page on the Web.

Bringing The 'Net Home

input forms to scripts written in various programming languages. Scripts are applications that accept information from users on Web browsers and return some type of response—items from a database, a list of files containing a certain word, the current date, whatever.

WebSite includes a few CGI-compliant programs to get new site administrators started, such as a useful search tool. A variety of shareware and freeware CGI scripts are available on the Internet, giving even nonprogrammers a chance to soup up their sites.

One of the best ways to find the most productive use of an intranet is to give employees the tools not only to view HTML documents but to publish them. As mentioned above, Microsoft is giving away Internet Assistant add-ons for Word, Excel, and PowerPoint that format documents in those programs to HTML with the click of a button. With such tools, anyone who knows how to use a word processor could keep a home page filled with links to documents others in the company might need to access. Employee home pages could be organized with departmental home pages or pages based on projects.

As Web server capabilities make their way into operating systems, intranets will become even more "bottom up" rather than "top down" systems. For the creative company, the shift only can enhance communication and thus productivity. Just as the Internet is driving new fortunes in the outside world, an intranet may be just the thing to enhance efficiency in the office. ●

by Alan Phelps

For More Information:

Web Commander
Luckman Interactive Inc.
(800) 711-2676, (213) 614-0966
<http://www.luckman.com/index.html>

WebSite
O'Reilly & Associates Inc.
(800) 998-9938, (707) 829-0515
website@ora.com
<http://website.ora.com/>

WebSTAR
Quarterdeck Corp.
(800) 354-3222, (310) 309-3700
info@quarterdeck.com
<http://www.quarterdeck.com/>

Intranets can be effective tools for intraoffice communications, but World Wide Web masters might not be content to let things end there. Once the intranet Web server is up and running, the only thing keeping it from being a true Internet site is a connection to the global network.

Web sites are increasingly popular ways for companies to get their message to a worldwide public. Even if you don't want to allow outsiders access to your server, an Internet connection still would let employees view intranet documents from elsewhere or view the Internet from the office.

The amount of traffic a site administrator anticipates is the main factor in determining what kind of Internet connection to obtain. Another important consideration is how much money is available for the project, as high-traffic lines cost considerably more than smaller connections.

Permanent physical connections are the fastest and most reliable Internet lines. Leased dedicated phone lines from the Web server site to an Internet service provider (ISP) can provide a 24-hour-a-day hookup. However, phone lines only handle transfers at modem speeds, which means up to 33 kilobits per second (Kbps) or so. This is tolerable for low-traffic sites, but if you get more than a few browsers requesting documents at once, things begin to slow to a crawl.

High-speed physical connections are known as T1 lines. These are much more expensive than leased phone lines but provide transfer rates of up to 1.544 megabits per second (Mbps). For large Web sites, a T1 line is practically a necessity.

A cheaper alternative to the T1 is a dedicated ISDN (Integrated Services Digital Network) line. Most phone companies today offer ISDN service for a monthly fee plus a per-minute charge. ISDN lines are six times as fast as modems at 128Kbps.

The cheapest possible Web site uses a standard dial-up Internet connection to connect to the ISP. It is usually possible to pay a fee for the exclusive use of one of the ISP's modems to ensure a connection. Dial-up



service is the least reliable of the connection methods because line noise and other factors can cause the modems at either end to hang up.

Regardless of the type of connection, in order for people in the outside world to find your server, it must have a recognized IP address.

Your IP setup might work for a small intranet, but on the outside, certain standards must be enforced to allow the tens of thousands of machines around the world to find each other. Domain names must be registered with the Internet Network Information Center (InterNIC), the clearinghouse organization that works to keep all domain names unique.

ISPs usually handle this process for an additional fee, but you can do it yourself. For details, write via E-mail to hostmaster@intermic.net. As we wrote this, the InterNIC charged \$100 for registration and two years of use; after that, it costs another \$50 annually to keep the name.

The biggest drawback to opening up a server to the Internet is the need for increased security. Most Internet users keep to their own business, but some derive pleasure from breaking into systems that don't want them. A firewall, which stands between your intranet and the outside world, allowing traffic only from certain hosts, is the best way to keep the public from tampering with your internal network. Often firewall applications are placed on routers, which are computers that direct traffic between different local networks.

Another interesting method of handling security is to use virtual servers. With virtual servers, one copy of a Web server package can act as several different IP addresses. One IP address could be the corporate intranet, while another could be a server open to outside browsers. A high level of security can be assigned to the internal web, keeping out all users not within the company's domain.

Security is not something to be taken lightly, but it also should not scare a company away from the Internet. A properly managed Internet/intranet site offers employees a useful new communications tool with little risk of compromising intrusions. ○

WordPerfect 6.1

Saving Time With Tab Settings



Do you use the Spacebar to position text instead of the TAB key? That may seem easier than defining tab settings, but inserting spaces into your WordPerfect document can create a mess if you need to make changes later. It also makes it difficult if you give the document to someone who *does* use tabs and tries to make revisions (is that you the secretary is cursing?).

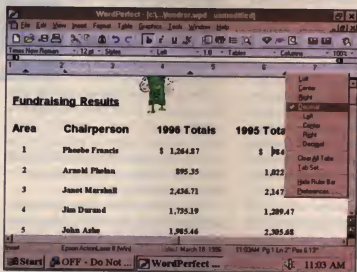
Pressing the Spacebar also is time-consuming. Assume you are creating a table of contents. Instead of pressing the Spacebar or the Period key repeatedly to move to the page number, you could insert a tab setting that lets you tab to the right side of the page, insert a page number, and insert a row of dots between the chapter heading and page number.

■ Using Tab Set

WordPerfect's default tab settings left-align text at every half inch; pressing the TAB key advances you to the next tab setting. To change tabs, from the Format menu, select Line, then Tab Set (Format, Line, Tab Set). We recommend clearing default tab settings (click Clear All) in the Tab Set dialog box before entering your own. To clear one tab setting, enter the tab position, such as 1", in the Position text box, and then click Clear. You can restore all default tab settings by clicking Default.

You can measure your tabs two ways. Left Margin (Relative) measures from the left margin of your document and Left Edge of Paper (Absolute) from the left edge of the paper. Assuming you have a one-inch left margin, a tab setting of 1.5 inches would be 2.5 inches from the left edge of the paper if it was a relative tab and 1.5 inches from the edge of the paper if it was absolute.

Select a tab type from the Type list. A Left tab aligns text on the left at a tab stop, a Right tab aligns on the right, and a Center tab



centers text. To align numbers at the decimal point, use a Decimal tab. Dot tabs, also referred to as dot leaders, can have any of these alignments and include a row of dots between the insertion point and the next tab setting. (Dot tabs would be used for something such as a table of contents.) Change the character for decimal tabs and dot leader tabs by specifying a character under Align Character or Dot Leader.

After choosing your tab type, enter a position for it (such as 3.2") and click Set. If you want to repeat a tab at regular intervals, specify the position for the beginning tab, select Repeat Every, and then specify the distance you want between the tabs. Repeat these steps until you have set up all your tabs. Settings take effect from your cursor position onward, allowing several tab settings throughout your document. Click OK to return to your document.

■ The Ruler Bar

The ruler bar provides a quick way to change tabs and serves as a visual reminder of where tabs are set. If the ruler bar is not in view, select View, Ruler Bar to display it. The ruler bar will contain the tab settings in effect at whatever point your cursor is located. The tab markers vary in appearance, depending upon the type of tab.

When you right-click the section of the ruler bar under the inch markers, WordPerfect lets you bypass layers of menus to quickly set your tabs and align your text.

To delete a tab setting, click the tab marker and drag it off the ruler bar. To delete all tab settings, right-click a tab marker and select Clear All Tabs from the pop-up menu.

To move an existing marker, click and drag it to a new position on the ruler bar. To move multiple markers, press SHIFT, drag across the tabs to select them, release the SHIFT key, and drag the markers to a new position.

To set a new tab, right-click the ruler bar to display the menu and select a tab type. Then click the ruler bar where you want the tab to be located. If the next tab is the same kind, you do not need to display the menu again; simply click the position for the new tab.

To hide the ruler bar, choose View, Ruler Bar, or right-click the ruler bar and select Hide Ruler Bar from the resulting menu. Right-click and choose Preferences to display a dialog box in which you can change the appearance of the ruler bar and indicate if you want it displayed in the current document and all new documents.

The above methods can be combined by displaying and right-clicking the ruler bar, then choosing Tab Set to display the Tab Set dialog box. ●

by Diane Kaye Walkowiak

Lotus 1-2-3 5.0

Setting Worksheet Defaults



When you begin using Lotus 1-2-3, all your worksheets will use the same font, column width, number format, alignment, and colors. These are set up as default values that are applied to the worksheet and can be changed. To apply a change to the entire worksheet, the simplest method is to edit the worksheet's default settings. If you are using multiple worksheets within the same file, changing the defaults lets you group the worksheets and make the same changes to all of them at once.

Two menu items affect default settings: Worksheet Defaults in the Style menu (Style, Worksheet Defaults) and View, Set View Preferences. Some of the defaults affect only the current worksheet(s), while others can be set to take effect whenever you start the program or create a new worksheet.

■ Making Changes

To change the default settings for your current worksheet, choose Style, Worksheet Defaults. From the resulting dialog box, you can select a font and font size from the lists under Font Face and Font Size. In the Other section, click the Up or Down arrow to set the column width (the normal default is nine characters), and change the cell alignment with the Alignment menu.

If all or most of the numbers in your worksheet will share the same format, you can set up a default. Click the Down arrow in the Number Format selection box, and choose the format you want. You also can choose if and how you want zeroes displayed and indicate if you want parentheses around all numbers and double parentheses around negative numbers.

If black text and a white background are too dull for you, change the default colors for your worksheet. You can select colors for text, cell background, and worksheet tabs. Another option lets you display negative values in red.

If you select the Display Windows Defaults checkbox, it overrides (but does not delete)

your font, color, and number format choices and displays your worksheet using the standard Windows defaults.

If you have multiple worksheets within the same file, you can apply the settings for the current worksheet to all the worksheets by choosing Style, Worksheet Defaults and selecting the Group Mode checkbox. After exiting the Worksheet Defaults dialog box, save your file. Then ungroup the worksheets by deselecting the Group Mode checkbox. Doing this before entering data in the worksheets prevents the loss of data. For example, if your worksheets were grouped and you deleted a column in one worksheet, the same column would be deleted in all the worksheets. Ungrouping does *not* restore the styles and settings applied to a worksheet before grouping.

■ Setting View Preferences

You can control the display of gridlines, scroll bars, and other items by selecting View, Set View Preferences. In this dialog box, you can change the viewing preferences for the current file, all files in memory, or all new files.

The Show In Current File section in this dialog box controls the current file. Using the

Worksheet Frame menu, you can select a different worksheet frame, such as displaying inches instead of row numbers and column letters. You also can choose whether to display worksheet tabs and gridlines. If you do display the gridlines, the color can be changed by choosing a color from a drop-down menu.

If you use keyboard commands to move within your worksheet, you can remove the scroll bars from view. Other options let you choose whether page breaks, charts, drawings, and pictures are shown. It does not affect the printing of the graphics. To change the display size of the cells, specify a new size in the Custom Zoom % field.

Clicking Make Default will make your settings the default for any new files.

Selections in the Show In 1-2-3 section become the default settings for all files in memory and for new files. Use the checkboxes to determine if the SmartIcons, Edit line, and status bar are displayed. ●

by Diane Kaye Walkowiak

Tips For Creating Default Settings

- ▶ When choosing fonts for column and row headings, use sans serif fonts such as Arial. Save serif fonts such as Times Roman for data. Because sans serif fonts are heavier, they are more ideally suited for headings and document titles.
- ▶ Avoid using anything other than black for data. Most colors are irritating to read, especially with smaller type sizes. If you must use colored type, use it sparingly to place emphasis on cells or for headings. Select dark colors for text; the lighter colors are difficult to read on-screen or on paper.
- ▶ Use light colors for backgrounds, such as shades of gray or pastels. Dark background colors can obscure the text. Using light type on a dark background is about as pleasant as looking at a neon sign all day; on shaded backgrounds, use very dark or bolded type.
- ▶ Always set a column width that is one or two characters larger than what you think you will need. It will save resetting the width later. ●

Microsoft Word 6.0

Calculating Formulas In Expense Reports



With so many powerful features, *Microsoft Word* may be the only productivity tool you'll ever need. For instance, Word automatically lays out data in table format, without requiring you to calculate tab settings. Simply tell Word how many rows and columns you want, then wait as the program creates the table. If your text exceeds a cell's width, Word expands cell size to hold the text.

There are two ways to create tables in Word. The first is to open a document, click the insertion point where you want the table to begin, then open the Table menu and select Insert Table (Table, Insert Table). In the Insert Table dialog box, enter the desired number of rows and columns, specify column width (or use the default settings), then click OK. The table will appear as configured.

Or, you can use the Table Wizard, which creates a document based upon your specifications. The Wizard is activated in the Insert Table dialog box.

When the Wizard starts up, select from six table styles, then answer the on-screen questions. For example, if you expect your table to exceed one page, direct Word to repeat column headings on every page. The Wizard inquires whether column headings should align left, center, or right. An AutoFormat option applies predefined borders, shading, or colors and resizes table layout as formatting changes.

■ Creating A Table

With Word's tables, you can add numbers in rows or columns; subtract, multiply, divide, or average cell numbers according to specified formulas and functions; and calculate percentages. Word's number crunching options, however, aren't as robust as *Microsoft Excel's*. For example, Word's cell values are always absolute, never relative. Additionally, a cell's unique reference isn't apparent because Word doesn't explicitly label columns or rows. However, Word's table feature is enough to perform simple

calculations, such as quarterly or annual expenses.

We'll create a table with six columns and 22 rows. Label columns one through six as follows: Description, Quarter 1, Quarter 2, Quarter 3, Quarter 4, and Total. In the Description column, name cell A2 "Advertising." Then fill in each cell in the Description column as listed in the chart below.

Enter amounts for each category except for cells A10, A20, and A22, which will hold formulas.

When entering text, press the TAB key to move to the next cell, SHIFT-TAB to return to the preceding cell, the Up or Down arrow keys to move to the preceding or next row, and ENTER to move the cursor to the next line in a cell.

■ Composing Formulas

To enter a formula in a cell, choose Table, Formula. Enter the formula in the Formula field, then select a number format from the menu. When constructing a formula, you must use cell references (such as B9). The formula for Meals@50% in the Quarter 1 column is =B9*.5, which tells Word to take the amount for meals in cell B9, multiply it by .5 (the current tax deduction rate for meals and entertainment), then enter the result in cell B10. Word returns an error if you compute the product of two numbers using parentheses, such as =B9(.5); you must use an asterisk (*) for multiplication formulas.

You can't simply add the figures in column 2 to get the total number of first quarter expenses. This column includes amounts for meals and mileage that should not be computed in Quarter 1 expenses. Word cannot compute embedded formulas, such as:

$$=Sum((B2:B8) + (B10:B18))$$

The formula to compute total expenses for Quarter 1 must be written as:

$$=Sum(B2:B8)+Sum(B10:B18)+Sum(B20:B21)$$

To see a cell's formula instead of the calculation it returns, select the cell, then press SHIFT-F9. To see every formula in your table, press ALT-F9. If you change cells referenced in a formula and want to update the calculations, select the cell with a formula, and press F9. To update every table calculation, press CTRL-A.

Cells E2 through E22 in the Total column have the same formula: =Sum(Left). This formula directs Word to sum all numbers in the row of cells to the left of the selected cell. To copy a formula, select an entire cell, press SHIFT-F9 to reveal the formula, then press CTRL-C. (The entire cell is selected when highlighted content extends to cell borders.) Position the cursor in the cell where you want to copy the formula, then press CTRL-V to paste the formula. When all formulas have been pasted, update the cells. ●

by Carol S. Holzberg, Ph.D.

Expense Categories

Enter these names under the Description column of your table:

A3	Bank Charges	A10	Meals@50%	A17	Rent/Utilities
A4	Courses	A11	Miscellaneous	A18	Supplies
A5	Dues	A12	Phone	A19	Mileage
A6	Equipment	A13	Photocopying	A20	Mileage@.30
A7	Filing Fees	A14	Postage	A21	Parking/Tolls
A8	Insurance	A15	Professional Services	A22	Total
A9	Meals	A16	Publications		

Word Pro 96

Creating An Index



One of the nicest tool sets in the Word Pro word processor is its Index features, which help users create indices for their documents. With these tools, you can create an index for a document or a portion of a document. You also can define how the index will look, create primary and secondary entries, and quickly update or delete all indices in a document.

There are three basic steps involved in the creation of an index: marking text to appear as index entries, specifying index options, and generating the index. (Information about the other Index features is available in Word Pro's online Help.)

■ Marking Entries

To mark index entries, you will need to call up the Mark Text bar. Open the Text menu, select Mark Text As, then choose Index Entry (Text, Mark Text As, Index Entry). The Mark Text bar will appear above your document and below the SmartIcon bar.

At this point, you will want to decide if your index will have primary and secondary entries. For example, an entry of *Bear*, *Polar* has the primary entry of *Bear* and the secondary entry of *Polar*.

There are two ways to mark primary entries. Which one you use depends upon your document and how you want your index formatted.

If you want to use the same phrasing in the index as in the document, highlight the text with your mouse. When you do so, the text will appear in the Primary box on the Mark Text bar.

If you will be using different phrasing in the index, place the insertion point in the area you want indexed, then type the desired index description in the Primary box. The typed description is what will appear in the index. Secondary index entries are marked when you type the desired text into the Secondary box.

Once the Primary and Secondary boxes have the correct index entries in them and the



insertion point is in the correct position in the document, mark the entries by left-clicking Mark on the Mark Text bar.

The Mark Text bar has several other handy options. Left-clicking the And Vice Versa box so an X appears in it reverses the order of the Primary and Secondary entries, with both versions appearing in the index. The Mark All button marks all of the entries identical to the one that's listed. The Remove button removes the currently selected index mark.

■ Options

To access the marking options, left-click Options on the Mark Text bar, which opens the Index Mark Options dialog box. By default, the page number of the entry is referenced in the index. To turn off the default, left-click the box in front of the Page Number option so an X does not appear within it. Likewise, if you want to use cross-referencing, left-click the See Also box so an X appears within it. Then enter the desired text.

In most cases, you will want to use the default index mark options. To change these items, you can do so by experimenting a little or by accessing Word Pro's online Help.

■ Generating The Index

Once your index entries are marked, you can generate your index. To start, select Create,

To create an index in Word Pro, you need to mark index entries with the Mark Text bar, which appears between the document and the SmartIcons. Once entries are marked and marking options are chosen, the index is generated with the Index Assistant.

Other Document Part, Index. This loads the Index Assistant, which has two steps: creating a look for the index and placing the index.

To complete the first step, left-click the divider named Step 1: Look and select the options you want. It is on this divider that you choose the design for your index. These designs include Standard, Corporate, Formal, Informal, Fancy, and a variety of SmartMasters. On this divider, you also can indent text and show alphabetical separators.

After making your selections on the first divider, left-click the divider labeled Step 2: Scope and Placement. This divider generates the index across any part of your document and places it where you want. The scope of the index can include the entire document, grouped divisions, or the current division. Index placement choices include the end of the document, end of a division, end of a group, or at the insertion point. You also can place the index within its own division.

When you are finished, left-click Done. The index will be generated and will appear within your document.

Creating a thorough index will still take time. With Word Pro's Index tools, though, the task will be completed much faster and with a lot less effort. ●

by Lori Beckmann Johnson

Microsoft Excel 5.0

Function Wizard



It's human nature to complete tasks as quickly and easily as possible. Most people prefer countertop bread machines to the traditional oven method, gas-powered snow blowers to snow shovels, and gas grills to charcoal ones. We tend to take whatever path completes a task well, but in less time and with less effort.

The same applies to working with software. Most programs have shortcuts and special features that help users complete tasks more efficiently—when they know the features are available. One such example is the Function Wizard in Microsoft Excel 5.0, which helps you insert Microsoft's built-in functions, or your own, in your spreadsheets.

A formula that takes one or more values (called **arguments**), performs an operation, and returns one or more values is called a **function**. Functions are used alone or as building blocks in the creation of a formula. But using them simplifies and shortens many worksheet formulas. To help, Microsoft includes several built-in functions with Excel, such as the SUM function. With this function, you can shorten the formula =A1+A2+A3+A4+A5+A6+A7+A8+A9 to =SUM(A1:A9).

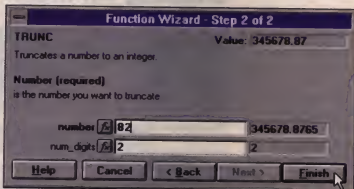
■ Building Functions

When using functions, you need to follow a specific **syntax**, or sequence of characters. For example, you begin all functions with an equal (=) sign, insert the function name (like SUM), and use parentheses to enclose arguments, separating different arguments with commas.

Besides using Excel's built-in functions, you also can create some for frequently used, specialized calculations. These are called **user-defined functions**.

Whether you use a built-in or custom function, you can manually enter it into a formula or cell, but the easiest method is the Function Wizard. (Consult Excel's online Help for information about creating a user-defined function.)

The Function Wizard helps you select the function you want to use, assemble its



In Step 2 of the Function Wizard dialog box, you enter the arguments for your selected function. Here, we chose the TRUNC function, which truncates a number to an integer. Its arguments include the number we want truncated (cell B2) and the number of digits we want after the decimal point (2). The value of the function with the current arguments will then appear in the upper-right corner.

arguments correctly, and insert the function into your formula. To activate the Function Wizard, click its button on the toolbar (the one with the fx on it). This opens the Function Wizard dialog box, which will say "Function Wizard—Step 1 of 2."

Step 1. The first part of defining and inserting a function is selecting the one you want to use. Select a function category; Excel's function categories consist of logical groupings of the built-in and custom functions. The categories include Financial, Date & Time, Math & Trig, Statistical, Lookup & Reference, Database, Text, Logical, and All (displays all worksheet functions).

After you select a category, a list of available functions will appear in the Function Name box. If you are unsure what a function does, click it once. The function name, arguments, and a short description will appear underneath the Function Category box. After you find the function you want, highlight it and click Next to get to Step 2, or click Finish. Clicking Finish skips Step 2 and inserts the function without argument placeholders.

Step 2. Here you can easily enter numbers, references, names, formulas, text, or other functions as arguments for your function. In the upper-left of this dialog box, you will see the name and brief description of the function. In

the upper-right corner is the calculated value of the function using the current arguments.

The main portion of the box has the argument edit boxes. To the left of these boxes is the argument name; to the right is a value box that provides the calculated value of each argument. Between each argument name and its edit box is a Function Wizard button, which opens another box and lets you nest functions—up to seven levels—within the argument.

To activate an argument edit box, click the argument. When an argument is activated, a description of the argument appears in the display area. If an argument is required for the function to be entered successfully, the word "required" appears in parentheses next to the argument name.

Your first step is to enter valid values for each required argument. After you do so, the calculated value for the function will appear in the Value box. When this is correct and you are happy with the results, click Finish. The function will be inserted into the cell or formula.

Although using functions is initially awkward, they can make complicated formulas easier to manage and easier for others to follow. Using functions to help you work more efficiently just follows human nature. ●

by Lori Beckmann Johnson

Quattro Pro 6.0

Creating Slide Shows



Quattro Pro is one of the most technically complete software products available today. Take, for instance, Quattro Pro's ability to help you turn your spreadsheet information into stunning graphics. If printed graphics are not enough, check out Quattro Pro's feature for creating slide shows with spreadsheet graphics.

Quattro Pro is not presentation software, but it will help you display your data as though professional-level presentation software were at work. There are five basic steps to creating a slide show:

- Creating the graphics to be displayed (in sequence), including a bullet chart to be used as the first slide in the show.
- Creating a new slide show.
- Specifying which graphics will be included in the show, and in which order of presentation.
- Saving the slide show.
- Presenting the slide show.

The beauty of Quattro Pro's slide show feature is that you do not need to spend a lot of time learning it. While there are no limits to how you can create your slide show, you do have to make your first slide a bullet chart. You also can insert as many of these bullet charts as you want in a slide show to present text without any graphics. (Because creating bullet slides is a fairly simple task, we won't cover it here.)

■ Getting Started

Quattro Pro lets you create slide shows in several ways. We will illustrate the method that requires you to make your charts and graphs before creating the slide show.

To create a slide show using existing Quattro Pro charts and graphs:

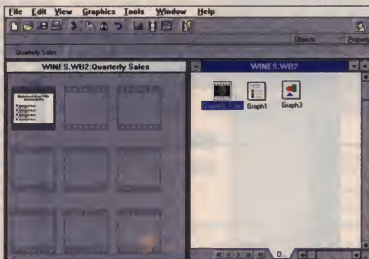
1. Open the spreadsheet that you want to associate with the slide show. We recommend making an initial run with a sample file that is included with Quattro Pro. We will use *Wines.wb2*, which is in the *\QPW\SAMPLES* directory.
2. From the View menu, select Objects Page (View, Objects Page). Then, click the white space once. Note that the charts and graphs you previously created in the current spreadsheet appear as icons in the Objects Page window.
3. Click the Create Slide Show button (the one with a filmstrip on it), then name your new slide show. Your screen will fill with gray slide "frames." This view is called the Light Table.
4. Click Property at the rightmost edge of your toolbar, then select Light Table from the resulting list. Now set your general options for the slide show, paying special attention to the Default Effects settings. There are many Transition effects from which to choose; each of the settings in the Light Table dialog box makes the slide show unique.

5. To add your existing graphics to the slide show, select Window, Tile. The Objects window will appear on the right, and the Light Table window will appear on the left.
6. The first slide you will create is the Master Slide. This slide is the first one in your sequence and introduces the slide show. Select Slide Show, New Master Slide. You will see that Quattro Pro comes with a variety of master slide formats. For now, just select one, then close the master slide window. You now have a generic-looking slide in the master slide frame on the Light Table.
7. Select Slide Show, Master Slide Gallery to view slide show templates. Double-click any of the small images displayed to view them in larger format. Once you have selected a new master slide, click OK to continue.
8. Now drag and drop graphics icons from the Objects window onto slide frames in the Light Table window. Make sure that you place them in the sequence in which you want them to appear.
9. Select File, Save to save your work.
10. To run the slide show, open the spreadsheet and select Graphics, Run Slide Show.

There is one drawback to Quattro Pro's slide shows: You cannot edit text and graphics as slides. You will need to return to square one and edit text or graphics, then insert them as slides.

Once you gain confidence, you will want to make your slide shows even better by changing the transition method for each slide through the options detailed in Step 4 above. The transition method is the most dynamic part of a slide show and will help keep viewers' attention during lengthy presentations. ●

by Robert Mullen



Using drag-and-drop functionality, Quattro Pro's Slide Show feature lets you create presentations using graphics created from your spreadsheet's data.

Quicken Deluxe 5.0

Online Banking

5.0 FOR WIN

A PERSONAL FINANCE

major factor in the banking industry's dramatic change in the past two decades is the growing frequency of electronic transactions. You can use an ATM to perform many banking functions 24 hours a day. You probably have adapted electronic banking to your home finances by using *Quicken* to track your accounts.

If you're using *Quicken Deluxe 5.0* and a participating financial institution, you can connect your home computer with your bank's computer and perform transactions from your desk.

Some of the features available through *Quicken's* online banking are:

- Receiving up-to-date balance inquiries.
- Transferring funds between accounts within the same institution.
- Viewing which transactions have cleared.
- Downloading cleared transactions into *Quicken*.
- Paying bills online through *Quicken*.

When using online banking, you have a specific PIN and an account password to protect your account. Remember: Your computer must have a modem to use *Quicken's* online banking features.

Using the Online Banking or Online Bill Pay features requires more than simply clicking their icons at the *Quicken HomeBase*. You first must contact a participating bank and sign up for online banking service. Each financial institution will set the fee for their services. You can call *Quicken* at (800) 224-1047 to obtain an up-to-date list of participating institutions.

■ Setting Up An Account

After you sign up for online banking through your financial institution, you'll need to specify the online option in your *Quicken* account information.

If you're setting up a new account, click the Activities menu at the HomeBase screen. Then select Create New Account. Click the type of account you want to create; we'll use a checking account here. *Quicken* then will walk you through the process of setting up the account, prompting you about what information to enter.

We'll focus on the third section—Online. At the first screen, *Quicken* will ask whether you've signed up for online banking or online bill paying for this account. Click the appropriate Yes button(s), followed by the Next button. When you sign up for online banking, you'll receive an information packet from the institution that contains the data you'll need to enter on the next few screens. Enter your financial institution's name, the account routing number, the account number, the type of account, and your social security number in the appropriate boxes. Click Next when you're finished with each screen.

If you want to edit an account you're currently using to enable online banking, you'll need to click that account in the Account List window. Then select the Edit Account command from the Activities menu (Activities, Edit Account). You then can follow the steps outlined in the previous paragraph.



Missing transactions in your check register are a thing of the past since *Quicken* can retrieve your bank's data and update your records.

■ Retrieving Data

When you dial into your online banking service, *Quicken* automatically will retrieve data for each of the accounts you have designated for online banking.

Select Online, Online Banking to begin. (You might need to select your financial institution from a menu before entering the Online Banking window.) To start the retrieval process, click Get Online Data. *Quicken* will configure your modem, connect you to the appropriate information area, and retrieve your account data.

Other functions you can perform in the Online Banking window include transfer of funds between accounts and automatic updating of your *Quicken* register. If you click Transfer Funds, you can move money between multiple accounts you have within a single financial institution. If you click Update Register, the program will compare your electronic *Quicken* check register with your financial institution's record of your account. If *Quicken* finds a transaction online that isn't entered in your register, it will enter the information automatically. *Quicken* also will mark transactions that match between the two sources as having been cleared.

You can send your bank E-mail by clicking Mail in the upper-left corner of the Online Banking screen.

If you've signed up for the online bill-paying service, it is relatively simple to use. Click the Write Checks icon at the HomeBase window. Along the bottom of the Write Checks window, click the button of the account you want to use. Then fill in the check information. Click the Online Payment box to have the transaction completed online. (If you don't see an Online Payment box, you're not set up to use that account for online bill paying.) After entering all of your transactions, select Online, Online Bill Payment. You'll see a list of transactions scheduled for payment; click Send to have them processed. ●

by Kyle Schurman

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■ It Takes Class

One type of formal curriculum can be found at a technical school or community college. These schools usually offer two-year associate degree programs that focus on specific elements of computer programming. The programs often give students the opportunity to gain a sound hardware background as well as learn a number of programming languages before graduation. Tech schools and community colleges also offer professional instruction and assistance, a guidance office that advises students in course selection, and access to certain high-end technologies that most students can't obtain at home. Plus, one of the most beneficial aspects of these schools is that they generally have career guidance centers that personally assist students in their job searches.

The downside of these schools is that they can be too specific in an arena that is broad indeed. "There are several different genres that would all come under the programming umbrella," Lyons says. "If you're wanting to program graphics, (the training) is going to be different than wanting to program ROM chips."

Logistically, it's usually only possible for tech school graduates to be comprehensively trained in one area of programming, and that's OK. This kind of specificity is necessary and adequate for prospective programmers who already know the particular skills they'll need to fulfill their job responsibilities. But what about prospective programmers who would prefer to have a well-rounded introduction to the field? That's where the four-year bachelor's programs come in, Zweben says.

Four-year computer science programs, rather than stressing specific aspects of computer programming, tend to emphasize the theoretical issues of computing that will let students grow with the technology, Zweben says. Programmers holding a bachelor's degree in computer science will not only be able to write a computer program, but as they write code they also will be better prepared to take into account external factors such as the computer's capabilities, the end-user's knowledge of computers, and potential developments that may affect the program in the future. A computer science background is also highly useful for a future career as a system analyst or consultant.

Of course, a four-year program also has its negative aspects. Unlike technical schools, which could be too specific, four-year programs aren't specific enough. A bachelor's degree in

computer science won't hurt anyone's job chances, Lyons says, but it won't necessarily help. If you don't know the language the employer needs you to work in, the degree may not help.

Depending upon the field in which you're most interested, a four-year degree may not be worth the time and cost because every case is unique, Lyons says. "If you have an idea of what you want to program, find somebody in that field, and ask them what programs they're using," he says. "Then look into a vocational school that offers a course in that particular language. I think your time and money would be much better spent that way."

■ Future Of Programming

Currently, a degree is not necessary to obtain employment as a computer programmer. But that's changing. The evolution of computer technology has made it necessary for everyone—including programmers—to learn more about computers. "Five or six years ago—maybe a little bit longer than that—if you knew a little bit about a word processor, a little bit about a graphics package, a little bit of spreadsheet, and a little bit of database, you were almost an expert," Lyons says. "There really wasn't much out there. But it's kind of changed now."

The speed at which the computer industry undergoes massive changes demands that programmers keep up with daily alterations, monthly stir-ups, and yearly revolutions. As programs become even more complex, future programmers, in addition to having technical competence, must possess the reasoning skills of

an analyst and the ingenuity of a consultant. Training for this type of computing will be impossible to receive from a book alone. In the midst of such change, the importance of a two- or four-year education becomes vividly apparent.

The Internet's rising popularity also will affect the programming profession. The demand for Java and HTML programmers has escalated during the past year and will continue to do so in the immediate future. "Those languages are new. They're budding now, and they're going to end up being very, very popular," Lyons says. "Every indication we have is that Internet growth is going to be exponential between now and the next couple of years, and those are the languages that are used to facilitate that growth."

Amidst all these changes, one thing hasn't changed: the tedious life of a programmer. "Programming is not like it looks on TV," Lyons says, "where they sit down, and in five minutes, they key some stuff in, and—BOOM—it comes up. Usually it's trial and error."

In fact, programmers spend more time searching for bugs, or program flaws, than they do developing software. Salaries range from a little more than minimum wage to healthy compensation packages that include stock options, full benefits, and a nice paycheck. And, of course, hours may range from a 40-hour workweek to three or four nights a week spent sleeping in the office.

But in spite of these hardships, Lyons says the programming field is growing. "The job market is continuously expanding and increasing, so you have a little bit of durability in it." Potential programmers should talk to professional programmers in their town, consult with guidance counselors at a local community college or university, and get enrolled in a program as soon as possible. ●

by Jeff Dodd

One thing hasn't
changed: the tedious life
of a programmer.

For More Information:

The Association for Computing Machinery
(212) 869-7440
<http://www.acm.org>

The National Association of Programmers
(800) 207-0892, (504) 677-8119
<http://www.naponet.org>

Turning A Notebook Into A Multimedia System

Are you missing out on all the fun of multimedia software just because you bought your portable computer before CD-ROM drives, sound cards, and speakers were typical options? Are you tired of your friends and co-workers flaunting their high-tech capabilities while you muddle through on a disk drive and a prayer? There is a way to jump start your trusty old notebook; invest in a portable multimedia upgrade.

As with most decisions in the world of computers, when you consider a multimedia upgrade, you face a daunting list of options. There are plenty of good reasons to try multimedia, numerous ways to do it, and a fistful of products that say they do it best. We'll try to sort it all out.

■ Why? Why Not?

Portable users can enjoy multimedia all the same reasons their desktop-bound buddies can. You can make an on-the-road presentation to a prospective business client using your fancy CD-ROM drive with video and stereo sound. You can drop in your CD-ROM encyclopedia to find some needed information while you are on the road. You can play a fast-paced action game to kill some time (and aliens) on a long bus ride. You even can use the portable as an overpriced audio CD player or to view your photo CDs.

Also, many programs today are being distributed primarily on CD-ROM. A CD-ROM can hold a lot more information than a diskette, and it makes installing programs easier and simpler. Most programs in the future probably will come in CD format.



There are three ways to plug any component, including a CD-ROM drive, into your portable computer. One is through a PC Card and slot connection, which lets you add peripherals through the credit-card-sized PC Card. Most portable computers sold in the last few years have at least one PC Card slot. The Personal Computer Memory Card International Association (PCMCIA), which consists of companies in the portable manufacturing and sales business, created the PC Card (formerly known as PCMCIA card) standard so that different machines could use the same products. The PC Card and slot combination is probably the most common path to portable multimedia. Three different types of slots and cards exist: Types I, II, and III. Make sure you know what type of slot or slots your computer has before you purchase the PC Card you intend to use in it.

The second way to hook up a new drive is through the parallel port, which is normally used for printing. A drive that runs through this port lets you keep your PC Card slot open for other uses. Also, most parallel ports let you plug your printer directly into the back of the

CD-ROM drive, so you don't have to constantly switch cables.

The third option is to find out if your portable computer manufacturer sells a docking station for the model you own. For example, IBM sells several different docks for its popular ThinkPad series of portable computers. The ThinkPad Dock I simply locks underneath the portable computer and adds speakers and an optional CD-ROM drive, along with an additional six pounds. Though it's heavy, it is still portable. IBM's other docking station, the Dock II, literally turns your notebook into a desktop unit. It has bays for installing additional drives; built-in speakers; and connections for a full-sized monitor, keyboard, and mouse.

Of these three ways to get your portable computer wired for multimedia, the PC Card and slot combination offers the most options.

■ Making The Connection

If you decide to use your PC Card slot, you can buy a package (or bundle) of multimedia equipment that includes everything you need, or you can buy the PC Card (usually with a

sound card built in), CD-ROM drive, and speakers separately. Most often, the portable packages will prove to be the simplest and most mobile way to go.

If you buy a complete multimedia package, you should be able to take it home and have it up and running in no time. In addition to the convenience of one-stop shopping, this approach also eliminates the possibility of any compatibility problems among your new pieces of equipment, and it should help keep your portable machine portable. We like the multimedia packages the best, and all of our reviews later in the story focus on this option.

The main advantage of going the opposite direction and buying separate components is that you can spend as little or as much money as you want on each piece of your setup. If you want a high-quality CD-ROM drive but speakers aren't that important to you, you can spend your money accordingly. The biggest downside to this approach is that if you aren't careful, you can end up with a pile of new equipment that belongs on a desktop and not on the road.

If you decide to buy your pieces separately, you can begin by finding a good PC Card. Depending upon how much money you want to spend, you can find a card that can do just about anything. The most basic cards available simply let you connect regular external components (such as a CD-ROM drive) to your portable. Others do much more.

New Media, a PC Card company in Irvine, Calif., has an entire line of PC Cards. The company's Toast 'n Jam card has built-in, 16-bit sound and a Small Computer System Interface (SCSI), which lets you hook up a SCSI-type drive. (SCSI is used for connecting computers and peripheral devices, such as a CD-ROM drive. Peripheral devices are attached to a single SCSI port through a series of connections called a daisy chain.) The company's GAMEjammer card has even more functions, including a joystick port and a tiny speaker. And, of course, there are plenty of other options out there.

Once you've decided on a PC Card, you have to choose the rest of your equipment. When it comes to picking out your CD-ROM drive, you probably can go with a typical external drive; just make sure whatever you buy is going to be compatible with your PC Card.

You should realize that if you do buy a regular external CD-ROM drive, you probably will sacrifice your ability to take the whole system on the road because you're going to need a power source, and batteries usually aren't going to be an option. Again, that is why we like the portable packages.

Another thing you have to consider when looking at any

with eight megabytes (MB) of random-access memory (RAM) and Windows 95. All of the multimedia packages we tested were compatible with DOS, Windows 3.x, and Win95. Overall, the documentation for Win95 installations was pretty poor. Much of it appeared to have been thrown together at the last minute.

We used our multimedia packages to install *Microsoft Plus!* for Win95 to run the multimedia program *Wide World of Animals* (with photos, text, video, and sound) from Creative Wonders and to listen to audio CDs.

Panasonic KXL-D721. The Panasonic KXL-D721 for \$599 is a sharp little double-speed CD-ROM player with a sound card and two small speakers. The speakers and drive connect to an audio module, which connects to the computer through a Type II PC Card slot. The entire setup is fully portable, drawing its power from a total of eight AA batteries or an AC power adapter.

The KXL-D721 was very easy to install. We didn't run into any problems with the PC Card on this unit, and the installation manual was complete. We had the drive operating in just a few minutes.

The Panasonic performed well for us, despite its slow double-speed drive. The drive has a 300 kilobyte per second (Kbps) transfer rate and an access speed of 250 milliseconds (ms). We had no problems running any of our test programs, and sound and video reproduction were good. The small speakers sounded fine, although they definitely didn't blow anybody away.

Our favorite thing about this package was its portability and ease of use. The CD-ROM drive is compact and light (14 ounces), and if you use the batteries, you can expect about two hours of juice. It also comes with a handy feature called "sleep mode" that powers down the unit after the drive sits idle for four minutes.

Our biggest problem with the KXL-D721 is a direct result of its light, portable construction. It looks and feels pretty fragile. While it seemed relatively well-made, a short drop from your car seat to the pavement might mean the end of this little machine.

Panasonic also offers several other portable units, including the KXL-D745, a quad-speed drive with built-in sound.

Zenith Data Systems Z-Player. This was a great machine, once we got it running. We some had problems getting the Z-Player,



Panasonic's KXL-D721 portable multimedia kit offers a double-speed CD-ROM drive, sound card, and speakers for \$599.

CD-ROM drive is the spin speed. There are still double-speed (2X) units out there, as our review products will show. But we think if you buy a separate drive, you should consider at least a quad-speed. We like the quads because they are faster than the nearly obsolete double-speeds but cheaper than the 6Xs and 8Xs. Consider how long you plan to keep the drive before you buy it; if you hope to have it for a while, the double-speed probably isn't your best choice.

When it comes to speakers, most people aren't going to be quite as picky. You can spend \$20 or more than \$100 for a set. If you have a discerning ear, spend the extra money. If you don't really care, spend less and buy a better CD-ROM drive. Just remember that you probably don't want big, heavy, plug-into-the-wall speakers if you plan to take them on the road.

■ Reviews

As we've mentioned several times already, we like the portable packages best. After all, why have a portable computer if you have to chain it to a desk to use all the toys? We tried out a few of the portable multimedia units currently on the market.

We installed all of the test units on a 486 Toshiba Satellite T2100CT portable computer

which sells for \$499, and its Type II PC Card to play nice with our Toshiba. Eventually, we had to download the Win95 installation software upgrade for the Z-Player from Zenith's Web site (<http://www.zds.com/>). Once we had the new software, though, things went more smoothly.

The Z-Player's greatest strength is in its sturdy, clever design. Two quality speakers and a microphone are integrated into the player itself, which means great portability without the hassle of equipment banging around loose in your travel case. The unit can run off six AA batteries for about 30 minutes, a NiCad battery pack for about 45 minutes, or AC power. It weighs in at two pounds loaded with batteries.

This machine performed well with our test software, even though it also has a slow drive. The double-speed CD-ROM drive has a 300Kbps transfer rate and a slow 320ms access rate. The stereo speakers performed very well, and the integrated kickstand made it easy to project the unit's quality 16-bit sound.

Zenith also offers an optional ISA connection card for the Z-Player, which means you can plug it into your desktop computer. This is a real bonus if you have considered adding multimedia to that system as well.

Axonix ProMedia Player. The ProMedia Player for \$499 was easy to install (once we found the correct set of instructions in the manual), and it ran our software well. The player connects through a Type II PC Card and has a double-speed drive with a transfer rate of 300Kbps and an access speed of 300ms. A second "sound module" unit, with two built-in speakers, is part of the package and attaches to the CD-ROM drive, forming a single, all-purpose multimedia unit.

Some of the features we really liked on the ProMedia Player included its built-in game port, its single-unit portability, the extra set of speakers Axonix included, and the handy nylon carrying case.

The biggest problem we had with the ProMedia Player was the construction of the unit itself. It seems somewhat flimsy, and the lid on the top-loading unit wouldn't always lock down when we tried to close it. Both sets of speakers were decent but not outstanding.

The unit weighs two and a half pounds and uses an AC power adapter. An internal rechargeable battery pack is available from Axonix.

MicroSolutions Backpack CD-ROM With Sound. The Backpack CD-ROM drive was the only quad-speed drive we tested, as

well as the only one that used the parallel port to connect to the computer.

Like the Z-Player, we had some problems getting the Backpack up and running. After exploring the different options available in the manual and on the MicroSolutions BBS and Web page, we tried calling the company's technical support. The company answered our call remarkably fast, and the friendly technician figured out our problem in no time. She showed us how to remedy it—in the Sysedit file—and she helped us get the machine working in just a few minutes.

Once we had the machine set up correctly, it ran all of our software well, outperforming the slower double-speed drives. The player has a maximum transfer speed of 600Kbps and an access speed of 250ms.

The unit provided good 16-bit sound; unfortunately, it did not come with its own speakers. The drive's other drawbacks included its large size and weight (more than four pounds) and its dependence upon an AC power adapter (no batteries).

The Backpack would, however, make a great choice for anyone interested in using it for both their portable and desktop PCs. We installed the Backpack on our Hewlett-Packard Vectra M2 4/66 desktop computer with Windows for Workgroups 3.11, and it worked very well. It was easy to move the unit between the two computers, and we never had to open the case on our desktop PC.

The Backpack drive also comes in a 6X version. The quad-speed unit with sound that we tested sells for \$449.

As you consider all the options available, keep in mind that slapping a new CD-ROM drive, sound card, and speakers on a notebook that is well past its prime probably isn't a sound economic decision. If you are considering buying a new machine in the near future, you might save the money necessary to upgrade the old one and spend it on extra options for the new one.

However, if you have a decent machine that could be considerably more useful with all the capabilities multimedia can add, one of the packages above or a custom-designed setup might work for you. The only way you can really know is to give one a spin. ●

by Tom Mainelli

For More Information:

Backpack 4X CD-ROM Player
MicroSolutions
(800) 890-7227
(815) 756-3411

KXL-D721
Panasonic
(800) 742-8086
(201) 348-7000

Toast 'n Jam PC Card
GAMEammer
New Media
(800) 227-3748
(714) 453-0100

ProMedia Player
Axonix
(800) 866-9797
(801) 521-9797

Z-Player
Zenith Data Systems
(800) 533-0331
(847) 808-5000

The Z-Player from Zenith Data Systems is a portable package with a double-speed CD-ROM drive, sound card, and speakers integrated into one mobile unit, which costs \$499.



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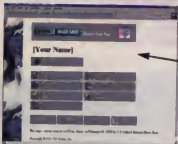
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Drop Everything, Sign Up, & Tie In To The 'Net

Before the Internet became the headline-grabbing monster it is today, options for connecting to the worldwide network were few. Most homes and businesses languished in digital isolation, while lucky computers at certain research and military organizations zipped data packets amongst themselves.

Today, things are dramatically different. The Internet is just a phone call away from anyone, and it's a local call at that in urban locations. Going online is a relatively easy, painless procedure that anyone can do with a few tips. All it takes is a computer, a modem, some software, and a little cash.

Most private Internet connections are **dial-up accounts**, which means the home client computer must contact an Internet service provider's (ISP) host computer through phone lines. The client computer has access to Internet tools such as E-mail only when the connection is active. This type of system is fine for the average user who doesn't need to be online 24 hours a day.

Dial-up Internet accounts fall into a few categories. At one end of the spectrum lies the **terminal account**, a plain-text connection in which the client computer's monitor basically becomes a monitor for the ISP's host computer. E-mail and other files the user might read are actually stored on the ISP computer but displayed on the home monitor. Though terminal connections are often cheap or even free in some cases, the lack of graphics is a major disadvantage. The famous World Wide Web, a global library of interlinked

information, isn't nearly as useful, or appealing, in text-only mode.

On the other hand, terminal connections are good for older computers that don't have much in the way of graphics capabilities anyway. An old 286-based machine with a decent modem makes a good system for sending and receiving E-mail with a low-cost terminal Internet account.

The next step up in the dial-up continuum is an Internet gateway via one of the commercial online services. Companies such as America Online give users the look of the graphical Internet and service that's easy for beginners to set up. Commercial services, however, can be slower, more expensive, and less flexible than full Internet connections. Users must make due with company-supplied software that isn't particularly fast or full-featured. Still, online services are a good

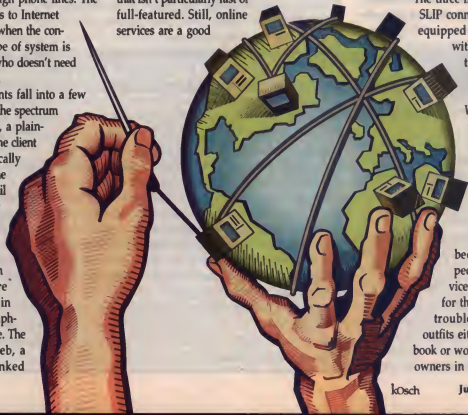
way for someone new to computers to get some experience.

■ Nothing But 'Net

Many online service subscribers who find they like to spend time on the Internet eventually move on to an Internet connection of their own. Local, regional, and national ISPs sell PPP (point-to-point protocol) and SLIP (serial line interface protocol) accounts that bring the 'Net straight into homes and offices. Rather than relying on someone else's computer to filter through the Internet for you, your computer becomes an actual part of the 'Net when connected. SLIP/PPP accounts support popular graphical programs such as *Netscape Navigator* and usually are faster than other types of connections.

The three ingredients for a PPP or SLIP connection are the modem-equipped computer, an account with some type of ISP, and the software that lets your computer communicate on the 'Net. We'll assume you've taken care of the first requirement. Next up is searching for an ISP to act as the meeting ground between the Internet and your computer.

Finding an ISP is becoming easier as more people demand their services. Urbanites with a yen for the 'Net should have no trouble locating a few local outfits either through the phone book or word of mouth. Computer owners in rural areas will have a





tougher time tracking down an ISP within the range of a local call. A long-distance phone call works for a 'Net connection, but phone company charges could quickly drive the total bill unacceptably high.

Some ISPs are large national or regional companies that maintain local access points in many larger cities. NetCom is one of the oldest and most established of these large providers, but the 'Net's popularity is fueling the growth of many others. Global Network Navigator (GNN) is an Internet-only service owned by America Online. SpyNet is a similar effort by CompuServe. Most of these national providers appear to be settling on a price of about \$19.95 per month for 40 or more hours of access time.

■ The Bell Connection

Telecommunications giant AT&T started a trend earlier this year by announcing it would offer five free hours of Internet access through its WorldNet to its long-distance customers. The company charges \$19.95 for unlimited service. MCI followed suit with a similar plan in March, and Sprint was expected to launch its own dial-up 'Net service soon. As we went to press, the AT&T and MCI services were offered in only about 250 U.S. cities, but that number is sure to climb quickly. Not to be outdone by the established long-distance companies in a newly deregulated environment, many of the regional Bells have 'Net service plans at various stages.

The entrance of phone companies into the consumer dial-up Internet business could spell trouble for the until-now rapidly growing local and regional Internet companies. A name like AT&T inspires trust in a vast segment of the marketplace, and consumers rushed to sign up for the company's startup software kit in unanticipated throngs.

Large providers such as AT&T or NetCom have a couple of advantages over smaller, one-city-only operations. The software kits that come free with membership in most large services make it easy to set up everything necessary for the 'Net, a valuable feature for newcomers. Travelers who regularly use portable computers also like the fact that national services have dial-up numbers in hundreds of cities. An account with a national ISP works just the same whether you are at home or on the road.

One possible disadvantage with huge companies is customer service. The better local companies bend over backwards to make customers happy because they see one-on-one

communication as their main weapon against outside competition. Large companies only can be contacted through often-busy help lines, and happy hold music becomes annoying after a few short minutes.

Another potential difference is the use of proprietary software by some large services. The free software these companies give out is easy to set up, but it isn't always the best available. Some ISPs, like SpyNet, let users substitute

software of their choosing, but others, such as NetCom, require a certain program. Packages like NetCom's NetCruiser aren't necessarily bad, but in the fast-moving world of the Web, they can't keep up with the latest advances.

The biggest factor in favor of large ISPs is the trial offers they throw out. Nearly every national and regional service gives out free time during the first month of each user's membership. These trial periods can help customers decide whether

Decoding Account Information

Larger Internet service providers hand out software that basically configures itself, but smaller companies may ask customers to do some work themselves. Along with the user ID and password, the following bits of information are vital to making a PPP or SLIP connection:

- **Access number.** This is simply the phone number the computer must dial to hook up to the ISP. In your dialing program, remember to add whatever number you might have to dial to reach an outside line from your location. Some dialing programs, such as Win95's Dial-Up Networking or Quarterdeck Winsock, have check boxes for this situation, while on others the user simply adds a 9 and a comma before the phone number. The comma tells the computer to pause between the 9 and the rest of the number.

- **IP address.** This number might be something like "192.168.0.74." An IP, or Internet Protocol, address is the number that identifies your computer to the rest of the world. Many dial-up servers are moving to a system of dynamic IP addressing, in which your IP address might not be the same each time you log on. This is fine unless you plan to run a Web server or some other setup that requires your computer always be at the same address. In the Winsock/dialing program, there should be some check box or another switch for dynamic IP. If the program doesn't mention dynamic IP, simply leave the IP address blank.

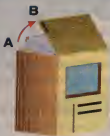
- **DNS.** The Domain Name Server address looks like an IP address: four sets of up to three digits separated by periods. The DNS is the PC that translates addresses such as "http://www.microsoft.com" into their equivalent IP addresses so they can be found on the 'Net. If the DNS area of the dialing program is blank or wrong, you won't do much surfing.

- **E-mail address.** Your E-mail address, in the form "username@provider.com," is the string of letters that others on the Internet or online services use to send you messages. For example, people who use America Online have E-mail addresses such as "jsmith@aol.com," where "jsmith" is their AOL user ID. Some dialing programs have a space for this information. If not, your E-mail program definitely will.

- **POP server.** This is the name of another computer at your service provider that holds your E-mail until you read it. If your computer was constantly connected to the Internet, friends could send messages directly to you. Because it probably isn't, the Post Office Protocol (POP) server receives your incoming messages and downloads them to your PC when it gets the correct signal and password from your E-mail program. POP server addresses usually look something like "mail.provider.com".

- **SMTP server.** The Simple Mail Transfer Protocol (SMTP) server is often the same machine as the POP server. While the POP server processes incoming mail, the SMTP server takes care of outbound messages.

- **News Server.** This computer name is necessary for reading newsgroups, the electronic bulletin boards of the Internet. Your dial-up program may not need this information, but remember to use it in your newsgroup reading application. News servers usually have names similar to "news.provider.com". ○





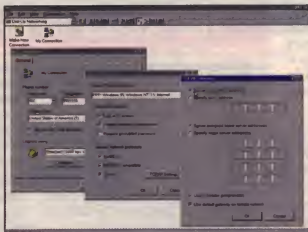
a particular service is right for them without spending any money. It isn't bad to try a few such offers in search of a provider that works for you.

Before settling on any ISP, it might pay to see how busy their lines are at the times you want to connect. A fast-growing company's modem pool might be too small to meet peak demand. It's a good idea to call the access number you plan to use at the times when you would like to use it. If you hear busy signals more often than the squawk of an answering modem, look elsewhere.

■ Software

Signing up with an ISP is usually just a matter of making a phone call. If the company sends its own installation software, configuration will consist mainly of following on-screen directions. Small providers might expect users to do a little more of the work themselves. A few might simply hand out a list with odd-looking numbers (see sidebar on previous page for help decoding it).

If the ISP account doesn't include software, users must come up with it on their own. The most important program for SLIP/PPP connections on Windows machines is the **Windows dialer** application. This small but crucial program is what commands the modem to dial the Internet service provider



Windows 95's built-in dial-up networking makes dialing into the Internet easy.

and make the connection to the 'Net. While connected, Winsock facilitates the transfer of data between the Internet at large and the computer. Without some type of Winsock program, no dial-up connections are possible.

Windows 95 includes a Dial-Up Networking utility (look inside My Computer) that fits the bill. One of the most popular Windows 3.x dialers is *Trumpet Winsock for Windows*, a shareware program available on the 'Net and in some software packages sold at stores. Many Quarterdeck products include a good, free Internet dialer called *Quarterdeck Winsock*.

Once the dialer program makes the 'Net connection, other applications take over. The main tool of the Internet user is the **Web browser**.

When most people speak of "surfing the 'Net" or being "on the Internet," they usually mean using a Web browsing program. Netscape Navigator and NCSA Mosaic are perhaps the two most famous Web browsers. Microsoft's *Internet Explorer*, included with most new computers and available in the *Microsoft Plus!* pack, is a popular Win95 browser. Many browsers are included free with other software packages or available on their own. Most can be downloaded for free on the Internet.

An E-mail program is the next requirement for a fully-equipped Internet machine. Some Web browsers, such as Netscape, include an

E-mail interface in addition to Web-browsing features. These Web E-mail programs function adequately, but serious E-mail users probably will want to check out other options. One of the best E-mail programs, *Eudora*, is available in a free "lite" version online. **Newsgroup readers** for accessing the Internet's Usenet "bulletin boards" are another useful category of PPP-compatible software. *News Xpress* and *Free Agent* are the best no-cost downloads.

These applications and many more can be found on the Web at Stroud's Consummate Winsock Apps site (<http://cws.wilmington.net/cwsa.html>). Of course, using the Internet to download free software is impossible unless you have some kind of Internet software

Download Files, Upload Money

Time flies when you're waiting to download graphics. Though it isn't fun, the reality of dial-up Internet connections is full of downtime. The World Wide Web is becoming more visually interesting at a far greater rate than modem speeds are increasing, resulting in slow-motion browsing.

Besides being boring at times, slow connections to Internet service providers or online services also can be expensive. The majority of users worry about an ever-ticking clock, and the time spent waiting around often costs the same as time spent doing something useful.

On big commercial services, it's easy to check how fast online time is fleeting and what it will cost. On America Online, try Keyword: **billing**. CompuServe members can use Go: **charges**. On Prodigy, use Jump: **billing information**, while on the Microsoft Network the information is under the Tools pull-down menu of any window.

Some proprietary software that national Internet service providers hand out has similar features. Global Network Navigator's dialing

program, for instance, features a session clock at the bottom of its window. If the service you use doesn't have any type of built-in clock, shareware might fill the gap. Stroud's Consummate Winsock Apps page at <http://cws.wilmington.net/cwsa.html> includes pointers to a number of timers designed to measure the length of connections. Failing that, there's always an oven timer or stopwatch.

Besides time, other charges to watch out for with some online services are extra-fee areas. Visiting all of AOL's areas won't cost any more than the basic charge, but both CompuServe and Prodigy include certain higher-priced areas. Pop-up messages or words at the bottom or top of the window should warn users who venture into a potential extra expense. Keep track of these special fees and mounting connection times before your money starts flowing down the 'Net as fast as your E-mail. ☐





already. One workaround to this dilemma is to sign up for a trial period of some service that provides its own software, such as NetCom or America Online. If you like the service, keep it. Otherwise, use the free hours to download the software you need for another, less proprietary service.

An easy, but more expensive, option is to buy one of the many all-in-one Internet kits. Quarterdeck's *Internet Suite* and Delrina's *Cyberjack* are among the more capable for sale, although any software store is bound to have several others. Most include some type of dialer, a browser like Netscape, an E-mail program, and maybe a news reader. These "Internet-in-a-box" solutions are nice, but many cost far more than they are worth. The individual software components are generally inferior to what can be found online for free.

The biggest lesson to learn in connecting to the 'Net is to not get swept up in a money-spending current. The Internet is becoming a useful tool for communication and research, but it isn't worth top-dollar status. Scrounge around for free programs. Shop around for an ISP. Use up trial period connect time. Get a feel for the 'Net before buying some huge, expensive software suite with an immediately out-of-date book. ●

by Alan Phelps

For More Information:

AT&T WorldNet
(800) 967-5363
<http://www.att.com/>

Global Network Navigator
(800) 819-6112, (703) 918-1802
<http://www.gnn.com/>

NetCom
(800) 638-2661, (408) 983-5950
<http://www.netcom.com/>

Quarterdeck
(800) 683-6696, (310) 309-3700
<http://www.qdeck.com/>

SpryNet
(800) 777-9638, (206) 957-8997
<http://www.sprynet.com>

The Road To Broadband

If the Internet reality doesn't quite live up to overblown expectations, the biggest reason is probably bandwidth.

Bandwidth describes the capacity of a system such as the 'Net to carry data. Although certain portions of the Internet can quickly transfer a lot of information, any home connection is only as fast as its slowest link. For most home users, that means the phone line running from the computer to the Internet service provider (ISP).

Today's 28.8 kilobits per second (Kbps) modems seem lightning-fast when compared to yesterday's 2400bps or slower devices, but that doesn't mean they can handle the future. Plain Old Telephone Service (POTS) is only good for up to about 33Kbps before line noise and other factors begin to interfere with data transmission. That speed limit slows static World Wide Web graphics to a trickle and makes real-time video practically impossible.

Telecommunications companies of every stripe see gold in a fast Internet, but upgrading connections to each individual home will take time and a lot of money. Video requires a connection speed in the low megabits-per-second (Mbps) range, more than a magnitude of order higher than poor POTS can achieve.

The answer could come from one of three directions. Telephone companies are experimenting with a system known as Asymmetrical Digital Subscriber Lines (ADSL) that could boost transmission speed to 6.312Mbps in one direction and 64Kbps in the other—perfect for such uses as on-demand video. Another standard, Symmetric Digital Subscriber Lines (SDSL), features speeds of 1.544Mbps in both directions. Both ADSL and SDSL are in the development stage. Telephone's main rivals, the cable TV companies, have a fast network of coaxial and fiber cable running to many homes. However, their systems weren't built for two-way transmission and will need piles of expensive switching equipment to hop into the 'Net business. The darkhorse in the race is power companies, who own a network of fast fiber-optic cables designed to provide

feedback on electric systems. These cables could carry 'Net traffic and are only as far away as the nearby utility line.

Although phone companies have the most experience in this type of business, the only thing clear about tomorrow's "broadband" Internet is that it won't arrive overnight. For users who can't wait, a "midband" solution is gaining a foothold. Integrated Services Digital Network (ISDN) connections use standard phone lines, boost speeds up to 128Kbps, and are available in most locations today. The 128Kbps capability isn't fast enough for video entertainment, but it works well for videoconferencing and Internet phone applications.

In short, ISDN begins to make the 'Net truly useful in everyday life. The speed comes at a premium, however. In our area, for example, an ISDN connection costs \$75 to install and \$45 monthly. Some phone companies lack a per-minute charge on top of such fees to discourage people from connecting all day.

Depending upon how you look at it, ISDN is either a stepping stone to broadband or a road to nowhere. ISDN is fast enough for people to use their Internet phone software to make phone calls across the Internet and do an end-run around long-distance charges, but it will never work for the lucrative multimedia entertainment content the phone companies want to peddle. However, midband access might help drum up more demand for broadband when consumers get a taste of its potential.

Eventually, competition probably will drive down ISDN charges to manageable levels. Besides the various phone entities in these days of deregulation, upstart cable company competitors also must be kept at bay. ISDN is a mature technology that works, but phone companies must see a profit in its cheap distribution before the 'Net becomes fun again. ○



Find It ONLINE

United States Swimming

<http://www.us swim.org/us swim>

Dive into this site, and soak up the swimming information. Learn the history of the sport and the development of the competitive strokes. Read biographies of famous American swimmers, follow the progress of the U.S. swim team, and receive updates on current meet results and Olympic swimming news. Recreational swimmers can sharpen their knowledge of basic safety rules, younger swimmers can learn about the best training centers, and aquaphiles of all shapes and sizes will enjoy splashing around in the pool of swimming-related information.

The Fresh Air Fund

<http://www.freshair.org>

The kind people at the Fresh Air Fund realize that some children need a vacation from more than just school. Since it was founded in 1877, this New York agency has endeavored to make memories for more than 10,000 children each year. Underprivileged youngsters between the ages of 6 and 18 are chosen to spend two weeks as the guest of a host family or as a participant at one of five summer camps. Web users can find out how to become a host family or a camp volunteer or simply where to send a financial donation.

Preview Vacations

<http://www.vacations.com>

Pack the bags, load up the kids, and rev the family truckster for the annual summer vacation ritual. But before you hit the

road, you'd better hit the Web and make preparations. The Vacation Preview gives you the chance to find the best holiday deal for a number of selected destinations. Check out the numerous travel packages that take you to the hottest vacation spots all around the world. After reading the valuable tips on how to find the lowest fares, make your own plane reservations.

Finally, use the multimedia presenta-

tions and comprehensive editorials by expert travelers to preview the highlights and not-so-highlights of your intended destination.

Barbecue'n On The Internet

<http://www.nottingham.com/barbecue>

Though there are many ways to cook a piece of meat, none is more fun than a barbecue. To find out how to do it right, warm up to this sizzlin' site. You'll learn all about the great art of barbecuing, including the theorized histories of the alfresco culinary event. Then brush up on your barbecuing savvy before brushing on the BBQ sauce: check out the tools you'll need to get the job done right, peruse the tips and techniques for achieving a successful barbecue, and thumb through the recipes for savory sauces and rubs (a dry marinade). Finally, you can become a member of the National BBQ Association, subscribe to a barbecue newsletter or magazine, read about the latest barbecue cook-offs, and link to a number of related barbecue and chili sites.

National Park Service

<http://www.nps.gov/parks.html>

Now that the weather's warmer and the government is up and running again, it's time to take advantage of this country's natural and cultural wonders and visit the United States' national parks. The National Park Service Web site lets you take a peek at each park before you get there.

Every park receives recognition and is complemented by extensive demographic data and helpful tourist tips such as the best time to visit, the expected weather, and what type of clothes to wear

sites, including access to information about the National Zoo in Washington, D.C. Read about the animals most threatened by extinction, find out what modern zoos are doing to preserve our endangered species, review one of the largest collections of animal pictures on the Internet, and scan important zoo stories. Four roars for this one!

An Introduction To Skin Cancer

<http://www.mauui.net/~southsky/introto.html>

As medical science has discovered over the past decade, a "healthy" tan may not be so healthy, and this site explains why. Concise essays outline the causes, types, and treatments of skin cancer in addition to the best methods of skin cancer prevention. Links to related sites provide even more coverage of dermatological research and treatments. Unlike many fatal diseases, skin cancer is preventable, so a quick visit to this site before you head into the sun may prove beneficial.

The Gardening Launchpad

<http://www.tpoint.net/neighor>

Whether you're trying to protect your crops from the summer heat or save your flowers from torrential rainfall, this site will help you raise a garden that will make you smile. Check out any of the 500 links for gardening and flower-raising tips. Subscribe to a gardening newsletter. Or just enjoy the beautiful pictures posted by dedicated horticulturists. Your thumb is guaranteed to be green after a visit to this site. ●

Compiled by Jeff Dodd

on your visit. Don't miss the Links to the Past, either.

ZooNet

<http://www.mindspring.com/~zoonet>

No need to fear lions and tigers and bears (oh my!) at this site; although you may encounter a few wild beasts, they're all behind glass. ZooNet gives you the chance to explore the world's zoos from your living room. Link to more than 100 zoo-related Web



Kicking Your CPU Up A Notch

The hunt for a good computer system has become a lot like dating: You find something that is compatible with your current needs, take the plunge, and then commit yourself to making it work for as long as you both shall live. The price drop accompanying technological advances makes the commitment to your PC slightly less dramatic, yet an investment of thousands is worth stretching to its maximum potential. An upgrade is one way to boost your system's power without purchasing a new system.

When considering the big upgrade, consider your own needs rather than the importance advertisers attach to the latest capabilities. A faster, more powerful computer may look attractive, but not everyone needs the extra zip. If you're content with your current applications, keep the status quo. For a majority of the new applications, however (or more specifically, multimedia applications), you'll need a 486 or higher central processing unit (CPU).

Although it's impossible to upgrade a 286 machine to Pentium-level performance, you can make performance improvements in two

ways. Additional random-access memory (RAM) can enhance your system's performance because the CPU can keep more of its executable files closer at hand. You also can upgrade the CPU itself. The CPU, which is the "brain" of your computer, receives information from storage and your fingertips, processes the coded information, and manipulates the input to do your bidding. Each chip generation (the 8086, 8088, 286, 386, 486, and Pentium microprocessors in the market-standard Intel line) marks dramatic improvements in the speed at which these manipulations occur.

The speed of the microprocessor depends not only on the speed at which the chip can process information but also on the architecture, or data transfer system. Data moves on electronic highways called **data buses**, which transfer the data to and from the microprocessor. The more lanes available on a bus, the faster and more smoothly the traffic will run. An address bus is a data bus that transports information within the processor. The 8086 through the 286 generations used the 16-bit bus, while the 386, 486, and the current Pentium chips have a 32-bit

capability. The **clock speed**, measured in millions of cycles per second or megahertz (MHz), is the rate at which the processor operates. The higher the frequency, the faster it runs.

The combination of clock speed and architecture indicates CPU power. For example, a 486 and a Pentium chip may have the same clock speed (say 66MHz), but the Pentium chip still executes commands faster because it processes larger chunks of data at once.

■ Outside The Chip

To reach a compromise between maximum chip speed and compatibility with the rest of the system, the data system may differ inside and outside the chip. For example, data traveling within the processor may move on a 32-bit bus but communicate with the system outside the chip at a 16-bit rate. Chips with this combination structure aren't quite as fast as those with the fastest data bus throughput.

There are several other considerations in overall speed of system performance, such as **cache memory** (a subsystem that stores frequently used RAM files), **math coprocessor** (a special chip that handles mathematical calculations), and **superscalar technology** (an architecture that allows more than one instruction to be executed at once), but the two largest considerations are RAM and the processor chip.

There are three standard methods of microprocessor upgrades: chip-for-chip, piggyback, and daughtercard upgrades. The type you choose depends upon the structure of the current processor chip and motherboard. The piggyback and daughtercard upgrades were designed for older systems sold before PC upgrades became common practice. The earlier chips were actually soldered onto the motherboard and couldn't be removed without damaging the system. The piggyback upgrade places a chip directly over the one currently installed. A daughtercard upgrade consists of installing an expansion board with a processor chip. In both cases, the new chip disables the old one so physical chip removal is unnecessary.

As motherboard and processor chip manufacturers realized that technology was changing at an alarming rate, they designed

Memory Lane

Though this doesn't look much like the personal computer you're accustomed to, it is one of its ancestors. The Altair 8800, considered to be one of the first "personal computers," was introduced by Micro Instrumentation Telemetry Systems of New Mexico in 1975. This "small" computer had an Intel 8080 microprocessor and 256 bytes of random-access memory (RAM), received input through a bank of switches on the front panel, and displayed output on a row of light-emitting diodes (LEDs). LEDs are the lights on modern systems that indicate the activity of disk drives, power, etc. If you think the resolution on your monitor makes output tough to read, consider reading a series of flashing lights! After you look at the Altair, that old 8088 may look a little more user-friendly.



From Our Readers...

Dear PC Novice:

I've tried unsuccessfully to install five mice on my Compaq Deskpro 286, 12MHz PC. Is this machine too slow to accommodate a mouse? Any suggestions? Also, can I install a modem and CD-ROM drive on this machine?

William J. Martin/Quincy, MA

The Intel 286 microprocessor was strides ahead of its competition after its release in 1984 because the 16-bit data bus allowed for faster information transfer. Today, however, the 286 has been left in the dust of the new multimedia-ready monsters. But the 286 may not necessarily be ready for retirement. Though it will never be up to the multimedia challenge, it still can use simple programs at moderate speeds, such as *WordPerfect*, *Lotus 1-2-3*, and some DOS-based games.

The 286 has the memory and speed capabilities to support a mouse, but the installation may be a little different than with today's models. Your problem may be in the installation method. A mouse can be installed in one of two ways, through the serial port or by installing a dedicated mouse card.

A dedicated expansion card is one that is designed to serve a specific purpose, such as a mouse card or a game card. If you've been trying unsuccessfully to install a mouse into the serial port, you might try using the dedicated mouse card, which plugs into the computer's expansion bus. The expansion bus is the set of expansion slots that attach the motherboard to outside devices. Another option is to install a specialized serial port card. A serial port card may be easier to find in your computer store.

If the physical connection is not the problem, the software, or device driver, that links the new peripheral to your CPU may not be compatible with your version of DOS. Double-check the requirements on the package, and look for a mouse that will suit your needs.

The 286 does have the power to support either an internal or external modem. For an internal modem, you must install a modem card. You should be able to install both the mouse and a modem simultaneously without putting too much of a strain on your system.

These dedicated adapters are going to be difficult to find. Your best bet is to look in stores that specialize in used computer parts.

A CD-ROM drive will be too much for a 286. The current quad-speed (4X) and the recently retired double-speed (2X) CD-ROM drives both require a minimum 386 CPU. Unfortunately, the only option here is to upgrade your CPU (see main article).

If you're looking for a system with all of these capabilities, consider a new system. If the new systems are out of your price range and contain a set of capabilities that are more than you need, consider purchasing a newer system from a used computer store.

Send questions about old computers to:

Your Old PC
c/o PC Novice
P.O. Box 85380
Lincoln, NE 68501 (Volume prohibits individual replies.)

upgradeable motherboards with chips that are more easily removed and replaced. A chip-for-chip upgrade replaces one chip for another, while an OverDrive processor is an upgrade chip for 486 and Pentium processors that runs along with and in addition to your current processor to boost performance.

A 286 can't support the jump to a Pentium performance level because the data bus system of the Pentium chip is incompatible with the older PC. The upgrade you select will depend upon your current microprocessor architecture and speed. Thus, pay careful attention to the type of chip already installed in your system.

You can find this information in three ways. The first and probably the easiest (depending upon your filing system) is to check the information packaged with your system. If this paperwork has gotten lost in the shuffle, there are other alternatives. The second is to check your system's components by typing `msd` at the DOS prompt. Microsoft Diagnostics (MSD) runs a diagnostic of your system and displays information about the components. The third method may take a little digging, but it provides an accurate description. Remove your system's cover, and find the processor. There will be a string of letters on it that tells you what kind of processor is in the machine.

■ Generation Gap

Generally, you can upgrade one "generation." For example, you can upgrade from a 386 to a 486. Be careful with this general rule because the chips must have similar architecture for a full generation upgrade. For example, you won't get a full upgrade from a 286 to a 386 because of the difference in architecture, but you can boost your system's power. When upgrading your PC, consider whether the new technology is compatible with the rest of your system. For example, a Pentium processor operating with only 640KB of RAM is going to move at a snail's pace.

Because the processor chip works with so many parts of your system, the idea of finding a compatible chip can be a little daunting. Don't be intimidated by the task of matching all the aspects of your current system; they aren't as fragile as they're made out to be. Companies such as Kingston Technology Corp. offer a 30-day, money-back guarantee on their upgrade chips to let customers test both compatibility and performance improvement.

Another concern is damaging the current system, but in reality, the system won't melt

down or blow up; it will merely refuse to run correctly, if at all. There is, however, a danger of frying the new chip, so be careful to purchase a chip that is equal to or greater than the power of your current system. Accidentally popping in a chip that is lower than what you currently have is less likely to improve performance and is likely to cost you the price of the chip anyway.

Keep in mind that newer does not always mean better for you. For example, Windows NT runs better on the new Pentium Pro, but Windows 95 performs better on the "old" Pentium chips. Remember to consider your needs when looking to upgrade your system. ●

by Elizabeth Panska

Keyboard Tips & Tricks

Many of us have become dependent upon mice and similar input devices to interact with our computers. But sometimes things can go awry. What if the mouse quits working, leaving your pointer frozen on the screen? Or what if you buy a computer that comes without a pointing device or comes with one you don't like? Or what if you just want to learn a few tricks for using the old keyboard? That's where we come in.

■ First Things First

Let's deal with the worst possible scenario first: Your pointer has frozen in one spot . . . or it has started scurrying around the screen with no regard for where you want it to go. While banging the mouse on your desk may relieve some frustration, it is not a recommended fix for this problem. (Trust us.)

If your pointer is doing the jitterbug, the first thing to check (and the easiest to remedy) is whether your mouse needs a bath. While it's not quite as easy as sticking the mouse in a tub of soapy water and scrubbing, it's a pretty simple process, varying, of course, from device to device. For example, instructions for the mouse we worked with said to remove the mouse ball and use a lint-free cloth to remove any dust, dirt, or lint on the ball. (Tape or mild soap and water are OK for removing stubborn residue.) The ball compartment should be gently wiped clean with a dry, lint-free cloth, and the ball should be completely dry before returning it to its compartment. Again, your owner's



manual may have different instructions; follow them closely so you don't damage your mouse.

If dirt isn't the problem, you may be experiencing an **interrupt request line (IRQ)** conflict between the mouse and another device. (The IRQ setting determines what priority the device gets when requesting attention from the computer.) An IRQ conflict occurs when two devices have the same IRQ settings. This can create either a frozen pointer

or a jittery one. To solve an IRQ conflict, you can change the device's IRQ setting. Your owner's manual should explain what setting the device ordinarily uses, what IRQ settings you can use as alternates, and how to change the setting. Often, it's as simple as repositioning a plastic block, called a **jumper**, over different pins on a circuit board that came with the input device.

If you're unable to fix the mouse right away, try some of the

keyboard tricks listed below until the problem can be resolved.

■ The Keyboard Advantage

Even if your pointing device performs like **Mighty Mouse**, using your keyboard instead may have advantages in some situations. For example, you can increase your productivity if you use key combinations because it'll be unnecessary for your hands to leave the keyboard while you're working with a document. Or perhaps you're finding your desk a bit crowded and would like to free up the space occupied by your mousepad or trackball.

Some keyboard tips are obvious and apply to any operating system; for example, the arrow keys next to the number pad control the cursor, moving it one unit in the direction the arrow indicates. (One character right or left, or one line up or down.) Most keyboard shortcuts, however, are specific to one operating system, or even one program.

Here's a look at some of the most common keyboard tricks for **Windows** and **DOS**.

Windows 3.1. To open a pull-down menu in a **Windows** application without using your mouse, press **ALT** to get to the menu bar. Then, use the arrow keys to move to the menu you want to open. Next, use the **Down arrow** to open the menu, or press the letter underlined in the name of the menu. For example, to open the **File** menu, press **F**. To choose one of the options on the menu once you've opened it, either

press the letter underlined in the option you want, or use the Down arrow key to get to the choice you want, and press ENTER. To leave the menu without performing any options, press ALT again.

To get context-sensitive help in a Windows program, press F1.

If you're using a dialog box, you'll notice that one button will have a broader border than the others. That button is the one selected; to open it, press ENTER. To move from one part of a dialog box to another, press TAB. When you've selected the application you want, press ENTER. If you want to change something in the dialog box (for example, the file name or drive in a Save As dialog box), use TAB to get to the part you want to change, and then type in your change. If the item is in a drop-down list, such as the list of drives in the Save As dialog box, use TAB to get to the list, press the Down arrow to open the list, and use the Up and Down arrows to reach the drive you want. When you've selected the one you want, press TAB again to get to the OK button, then press ENTER to save the document. (The same techniques apply to any dialog box.)

Let's look at some common tasks in *Microsoft Word for Windows*. To highlight a line of text in Word using the keyboard, press SHIFT and hold it while using the Up and Down arrows to highlight the desired text. (The Up arrow highlights the line of text before the cursor, and the Down arrow highlights the line of text following the cursor. You can highlight as many lines as you want by repeatedly pressing the arrow key while still holding down SHIFT.) Use SHIFT with the Left or Right arrow to highlight the character before or after the cursor. Again, you can use this technique to highlight more than one character. To undo the highlighting, press

the arrow key again without pressing SHIFT.

Once you've highlighted text, you can make the selected text bold by pressing CTRL-B. To italicize highlighted text, press CTRL-I. To underline it, use CTRL-U. To undo any of these text effects, repeat the steps you followed to create the effect.

Windows 95. Windows 95 has a feature called MouseKeys that lets users work with the keyboard instead of a pointing device. To start this feature and adjust the settings, go to Control Panel, then double left-click the Accessibility Options icon. Choose the Mouse page, then left-click the box in front of the Use MouseKeys line to place a check in it. This activates the MouseKeys feature. Then left-click the Settings button. The Settings For MouseKeys dialog box will open, giving you control of the cursor's speed and acceleration, as well as other setup options such as when you want MouseKeys to activate automatically.

The cursor movements are controlled using the keypad numbers on the right side of the keyboard. The central key, 5, simulates a mouse-click. The 0 key locks the mouse button to allow dragging operations. All other numbers move the cursor in the direction of that number relative to the 5. For example, the 7 key moves the cursor toward the upper-left corner of your screen. The decimal point releases the mouse button after it has been locked by the 0. To right-click with the number pad, use the minus sign. The slash simulates a left button press, and the asterisk mimics both buttons.

Navigating the screen in Win95 is easy even without MouseKeys. To move among the column of icons on the left side of your screen, the Start button, and the other buttons on the Taskbar, press TAB. (If nothing appears to



Even those
of you devoted
to your
pointing devices
may find
yourselves using
these tips
instead of
abandoning your
keyboard.



be selected, you're probably at the Taskbar buttons.) Use the Left and Right arrow keys to move between buttons on the Taskbar; use the Up and Down arrow keys to move among icons on the left of your screen. When the button or icon you want is highlighted, press ENTER. Once you're in an application, use ALT and the arrow keys to access the menus, as in Windows 3.1.

MS-DOS. In DOS, you'll use the function keys (the 12 keys marked F1, F2, etc., found at the top of the keyboard) for many tasks. Most function keys have different duties depending upon which DOS program you're in when using them. There usually will be a list of functions displayed

on-screen, so you won't have to guess which function key does what.

The F1 key provides context-sensitive help, just as in Windows. Press this key whenever you need more information about the screen, window, dialog box, or error message on your display.

■ Wait, There's More

These are just a few of the most basic moves. If you want to learn more nifty tips, the context-sensitive Help feature in your specific program will give you pointers. (No pun intended.) For example, the Help feature in MS Word 6.0 offers approximately six categories of keyboard tricks. Want to assign a shortcut key so you can insert the copyright symbol at the end of each of your masterpieces without having to open the Insert Symbol dialog each time? Check under Keys, Shortcut.

In *MS PowerPoint for Windows 95*, you can use Help to find other keyboard tricks, including creating an outline and running a slide show.

Your owner's manual is another good place to learn about keyboard shortcuts, including the tasks performed by the function keys in various contexts. For example, in the owner's manual for Win95, there are two-and-a-half pages of keyboard shortcuts. Wonder how to switch to the last window you used? It's in there. Curious about deleting an item without sending it to the Recycle Bin? The keyboard can help you do that, too.

Play around with the tricks you pick up, and see which ones make your work easier. Even those of you devoted to your pointing devices may find yourselves using these tips instead of abandoning your keyboard. ●

by Diana K. McLean

**Need help with your
hardware or software?**

**Looking for simple explanations
on technical subjects?**

Send us your questions!



WINDOWS 3.1

DOS

DOS COMPUTING

Q: Your January 1996 article "RAM: The PC's Memory Middleman" mentioned the possibility that one might run a DOS-based game on a computer having a hefty 16MB of RAM yet still get an "insufficient memory" message—and no running game. Apparently, just buying more memory won't solve the problem. But what will?

A: Actually, this can happen when you're running DOS games under Windows 3.x and Windows 95, too. As the article pointed out, due to the peculiar history of DOS originally allowing only 0.640MB of usable memory, there were various tricks developed to get around that limit. One was to set up a sneaky way of accessing the normally unreachable extra RAM by treating it as expanded (EMS) memory. Many games require that there be 1MB or more of EMS memory.

The problem is that when your computer first starts up, it won't always automatically treat any of its healthy 16MB of RAM as EMS memory. For that to happen, there has to be some software to tell the operating system (whether in DOS, Windows, or Win95) to do that. The most common way to do that (especially if you need to run programs from a "raw" DOS prompt after Windows is totally shut down) is by using a memory manager that starts up right after DOS does.

The most common memory manager is the one that comes with DOS: `Emm386.exe`. It's activated as a line in your `Config.sys` file, usually right near the top after the `Himem.sys` line. The line "Device=C:\DOS\Emm386.exe RAM" tells DOS to use the memory manager, and the parameter "RAM" tells it to allocate EMS memory "as needed." The line "Device=C:\DOS\Emm386.exe 2048" tells DOS to allocate no more than 2048KB (2MB) of EMS memory to the system. Of course, no matter what number you put there, it can't allocate more RAM than actually exists as EMS (and in practice not even quite that much).

To see how much, if any, EMS memory your system currently allocates, get to a DOS prompt, type `mem/c`, and press ENTER. If the information that appears on-screen doesn't mention EMS and expanded memory, you have none allocated.

(NOTE: If you run that check at a DOS prompt from a DOS window inside Windows 3.x or Win95 rather than at a "raw" DOS prompt, the amount of EMS you'd see also would be affected by certain PIFs, or Properties, settings made in Windows itself.)

Q: When you press `PRNTSCRN` on the keyboard, it sends whatever text happens to be on the screen directly to the printer. This is very handy when I'm in my DOS database program, and I just want to "dump" the one screen I'm looking at to the printer. But since I started using that database program inside Windows, the `PRNTSCRN` key trick doesn't work. Why, and can I fix it?

A: What's happening is that Windows itself gets first shot at deciding what any particular key combination means, and Windows thinks that when you press `PRNTSCRN`, what's on the screen should go not to the printer but into the Windows Clipboard. You have three remedies:

1. Try using any of the following key combinations, which Windows might not intercept: `SHIFT-PRNTSCRN`, `ALT-PRNTSCRN`, or very quickly hitting the `PRNTSCRN` key twice in succession (this works on some Northgate-brand keyboards).
2. Make sure your DOS program is running in full-screen mode (occupying the entire screen), or this second trick won't work. To check whether you're in full-screen mode, hold down `ALT` and press `ENTER`. After hitting `PRNTSCRN`, go to the Main group in Program Manager and open the Notepad icon. (Or for that matter, you can open your favorite Windows word processor or the Write icon.) Once there, on a blank page, click Edit, then Paste, and your text should appear on-screen. Then click File and Print.
3. You can tell Windows not to intercept certain special keys—that those keys "belong" to your DOS program. This is a bit more complicated; to do this, you'd have to learn how to change and/or make a Program Information File (PIF) for the DOS program you are using. (A PIF is a Windows file that provides information for running non-Windows programs.)

For example, if the program from which you want to send screen dumps to the printer is *WordPerfect* for DOS, it already should have a corresponding PIF called `Wp.pif`. This file either would be in your `\WP51` directory or your `\WINDOWS` directory. (If it doesn't have a PIF, you need to create it.) The PIF's name also would have to appear when you click once on the program's startup icon, then on File, then on Properties. To change or create a PIF, use the Windows PIF Editor, which is found in your Main group in Program Manager.

Once you have found and opened up the right PIF in your PIF Editor, click Advanced. Then go to the section called Other Options and put an X into the `PrtSc` or `Alt-PrtSc` box. Then save the PIF. The next time you open that DOS program and press `PRNTSCRN`, Windows won't intercept it, and the screen shot should go to your printer.



Q: Despite warnings in Q&A about Win95's backup having no way

to restore from DOS if Win95 gets hopelessly messed up (and can't run its own backup software for restoration), I found myself in exactly that situation. It took me an hour to get Win95 restored so I could run the backup and finally restore from my backup tape. When I restored from the tape, it seemed to me I was in effect re-installing Win95. It seems pretty inefficient. My question is: Isn't there some way to just install the backup program itself rather than all of Win95?

A: Well, not really. That was part of our concern about Win95's backup. At this moment, there's only one Win95 backup program that does exactly what you want: Novastor's Win95 backup includes a restore/rescue module that can be run from DOS and can read your tapes and restore from them without you first having to reconstruct a truculent copy of Win95.

If you're re-installing Win95, as you were, to immediately restore from a total backup tape, we can at least give you a faster way to do it: Choose Custom at the start of the Win95 re-installation; then, when you get to select optional "features" (such as Internet, etc.), select only the Backup applet. That should save you considerable re-installation time.



UTILITIES

Q: Before my last backup, I ran CHKDSK, which showed I had files occupying about 234MB. The backup said it was successful but that only 181MB were processed. Do I have a total backup?

A: Probably, yes. As we've described in detail in previous Q&As, because hard drives store files in minimum-sized clusters (usually with 8KB or 16KB per cluster), most files end up wasting space. So, for example, a 12KB file might be forced to use 16KB of disk space, thus wasting about 25% of the space it occupies. CHKDSK shows the space occupied, while the tape only has to back up a file's true size.

COMPUTER HARDWARE

Q: I bought a new Enhanced IDE (EIDE) hard drive. I read they'll run at 16MB/second. My computer is a new 486DX4/100. I found the CORE-

TEST benchmark program to test the drive and found that it only turns out 2.5MB/second sustained data transfer speed (admittedly much better than my older, regular IDE drive at 1.2MB/second). What's wrong?

A: First of all, the "16MB/second" claim is only for "burst" or "buffered" output. This is like saying your Corvette may let you hit 150mph for a few seconds until it runs into the next clump of traffic; in reality, it won't average more than 50mph on a normal highway. This "burst rate" is important and helpful for certain kinds of work such as video editing and playback. Don't ever expect to see much more than about 5MB/second on a sustained rate test.

Second, when we've benchmarked such drives, we've noticed that it's only on the Pentiums that we'll see near 5MB/second rates; on 486s, the highest we've seen is maybe 3.5MB/second with most being between 2MB and 3MB/second. (In fact, if you put one of these fast drives into an old computer that doesn't have a true Enhanced IDE interface—few made before 1995 do—you should expect only around 1.5MB/second.) You could call your drive maker and try to make some adjustments in your CMOS setup/BIOS, particularly checking if you have what's called LBA activated, to tweak a bit more performance. Even though your result isn't what the ads lead you to expect, it's not too bad for your system. It seems this drive performance side effect is another, if not often-touted, reason to consider buying a Pentium.

Q: My friend's computer has a problem I can't solve: Once in a while—especially when changing between Windows programs or when a program first opens—she gets the message:

"System Error. Memory parity error detected. System Halted." And then everything is frozen until we totally restart the computer. This is confusing because the only time I've seen the term "parity" has to do with modems online.

A: Parity checking is—whether in a stream of data coming over a modem line or in a stream of data in a RAM chip—a way of double-checking whether an item in the data stream might have been altered. In the case of RAM chips, it means that for, say, every 8 bits of data, there is 1 extra bit whose only job is to record whether the "number" stored in the regular 8 bits is an even or odd number. Now, with the binary numbers that RAM chips use, if 1 of those 8 bits accidentally changes, the parity (odd or even quality) of the number changes. So when your computer looks in there to find that number, it says, "Hey, wait a minute! The number I see inside those 8 bits is even, while the parity bit says it's supposed to be odd." So the computer knows that there's bad data in there, reports a parity error, and shuts down the whole system. Why shut down the whole system for 1 tiny error bit in millions of bits? Because in a worst-case scenario, that one error could print a check for a million dollars (instead of \$10) or unintentionally launch a cruise missile.

Parity errors usually come from failing memory chips; sometimes, they can seem to be coming from certain software because it's only that software that happens to tread into the one bad RAM chip. You can try running



COMPUTER HARDWARE (cont.)

some memory diagnostic software, but in our experience, such utilities rarely reliably detect intermittently failing RAM. You can remove the RAM and take it to a shop with a benchtester for RAM. Or you can just trade in the bad RAM for some new RAM and hope the problem goes away. Is it unethical to trade in RAM that you suspect may have one bad chip in it? Not really. The RAM dealers are set up to test that RAM thoroughly and will toss out the one bad chip or SIMM. They buy used RAM at prices low enough to expect that an occasional bad SIMM will have to be trashed.

Q: What's the story on "RPI" modems? I saw two US Robotics 14.4 modems on a store shelf. One model was called the Sportster 14.4 Si, and it was about \$30 cheaper than the Sportster 14.4. When I asked why one is cheaper, I was told that it's because the cheaper model uses something called RPI. But they claimed it works the same. What's the catch?

A: Most modems have error correction and data compression "protocols" built into their hardware. The purpose of both is to increase the speed of transmission and reliability. These are important pluses when connecting modem-to-modem as you might if you were telecommuting to your office. RPI stands for Rockwell Protocol Interface and is a way for modem makers to save a little money by putting the error correcting and compression "programs" into software (usually only Windows software) rather than into an extra chip on the modem. RPI is generally present in the lowest-priced 14,400bps modems. Zoom and US Robotics each make one.

In theory, RPI should work just as well as hardware-based compression/correction. RPI modems ask you to install RPI software that comes with them. However, you should be able to run just the modem without the RPI software and only sacrifice a little speed (maybe 20%). And in the case of connecting to a commercial online service, such as CompuServe or America Online, these built-in compression/correction schemes are replaced by the services' own methods anyway.

In practice, we've seen enough complaints about RPI modems to question whether it's worth saving the \$20 or \$30 that way. You see, with RPI software, your computer's CPU is doing things that normally the modem's chips would do, adding just one more thing that could go wrong with the PC.

ONLINE COMMUNICATIONS

Q: I use CompuServe (CIS) with a 28.8 modem and connect to various CIS

dial-in numbers that are rated for 28.8 baud speeds. After working with CIS customer service, I'm sure that I have all my software set up correctly to get the full speed (that is, I have WinCim set to my correct modem model and at 38.4bps, etc.). But sometimes I suspect that I'm not getting a true 28.8 connection (let alone a 38.4). Is there any way I can check?

A: Yes. A crude but good way is to download a zipped (compressed) file of a known size and time how long it takes. (This would work for anyone inside any commercial service such as America Online, but it won't work for timing downloads from the World Wide Web/Internet because in those cases, it's often the site, rather than your modem, that's the bottleneck.) We prefer downloading a zipped file because otherwise, the rate you get may appear exaggerated by the modem's own ability to do compression. Anyway, on CompuServe or AOL, find a file of about 100KB, download it, and time it. Here's a chart you can use for approximate benchmarks:

Downloading A 100KB Text File

Modem Speed	Approx. Time
2400bps	350 sec
9600bps	120 sec
14.4Kbps	60 sec
28.8Kbps	30 sec

Note that even with a perfectly good 28.8 modem, it's not unusual to get a rate somewhere between 14.4 and 28.8. You see, the rates often fall back to a 26.4 or even 21.6, depending upon the quality of the phone connection. Another way to check, at least on CompuServe with WinCim or CIM software, is to go to the seldom used Personal File Area by clicking Services and entering per. When you get there, select choice 11 (Enter Command Mode). You'll get a blank screen. Then type **terminal rate** and press ENTER. Normally it should respond with "Rate=38400" or whatever your current connection speed really is.

Q: Am I hearing right that if I install WinCim 2.01 (I have 1.4 right now), unless I "uncheck" the Use Winsock box (in the Session Settings dialog box), I'll have lower CompuServe performance than I do now? And if so, what do I give up by removing that feature?

A: Yes, it's true. The new version of WinCim has many nice features. One is the ability to let you do Web browsing ('Net surfing) without logging off CompuServe and dialing back in with the previously separate Mosaic Web browser software. However, as you hint, there seems to be a speed penalty for this convenience. If you use the checkbox we suggested to disable that dual-access feature, you get





ONLINE COMMUNICATIONS (cont.)

back the speed, but you give up the convenience of having to dial in only once. Life is full of trade-offs.

PRINTERS

Q: I notice that printers with PostScript capability cost more than otherwise identical ones that don't (ones that have only HP PCL capability). Are they worth the extra money?

A: Most graphics professionals insist that PostScript ability is essential for them and desirable for most users. We'll accept to an extent the first claim, but we're skeptical about the second. One difference between PCL and PostScript is that with PostScript, you gain extra control of certain kinds of output. An obvious difference is that the PCL printer can't print PostScript graphics (EPS files). (True, you can get software to convert an EPS file to, say, TIFF. Once converted, however, it may not resize as well or may pick up a jagged edge on curved lines.)

Not as obvious at first, but more important in the end to professionals, is control over halftoning. (Halftoning is the process of splitting a photograph into small, evenly spaced dots that blur together when printed.) PostScript has halftoning built in, so you can specify technical printer instructions, such as "print a 600dpi graphic at 70 lines per inch at a 45-degree angle," something that's not easily done with a PCL printer.

Another equally important point: When you output first on, say, a 300dpi PCL printer as a draft and then later send it to a service bureau for high-resolution 1200dpi output, the service bureau is likely to have a PostScript-driven output device. If you've proofed on PCL, there may be slight changes in output when you "translate" it to PostScript for the service bureau—slight changes that could screw up an expensive job. If your original/proof/draft output was also in PostScript, you could be more confident that things will stay stable as you move between other output devices.

For most users, these things are somewhat esoteric. And if your laser printout is your final product, PCL and PostScript should be about equal. In fact, we've often tried to get someone to show us an example of the same few pages of diverse graphics printed from the same software, in one case using the PostScript printer drivers and in the other using the PCL printer drivers. We wanted to see if a PostScript printout had significantly better-looking output. Someone has yet to meet that challenge. Keep in mind that less than 5% of Windows users have PostScript printers. Fifty million PCL printer users can't be wrong.

If you do need to have the printout reproduced (photocopied, make printing plates, etc.), PostScript's control of halftones and whatnot is important. Therefore, with PostScript you pay up-front for ease of use, control, and consistency as you move between different output devices and not necessarily for better output at your printer.

Q: I have a new HP-5L printer, and when I tried to install the drivers/software, the install reported insufficient space on my C: drive (something about the "temporary install directory"). The only option it offers is to terminate the install and create more space. This troubles me because I've got several megabytes of free space on the D: partition, and I can't figure out how to tell the installation procedure to use D:. Tell me that I have some option other than tediously deleting and later re-installing stuff from my small—but carefully configured—C: partition.

A: This does happen with some software that assumes your C: is your only or biggest drive. You do have another option: Rather than running the regular installation software (starting with HP's diskette #1), you can just go to your Main group, then Control Panel, and click the Printers icon. Click Add, and the Install Unlisted Or Updated Printer Driver should be highlighted. Put HP's diskette #3 in your diskette drive and click Install. The name HP LaserJet 5L (PCL) should appear. Press OK. This will not install all the HP bells and whistles, but the main printing features should install just fine.



MISCELLANEOUS SOFTWARE

Q: Is there any speed-reading software, which will highlight the lines of text in my E-mail or CD-ROM documents and force my eye to scroll down faster?

A: We don't know of any software exactly like that. The only speed-reading software we dug up was *Speed Reader for Windows* (Davidson & Associates, 800/545-7677, 310/793-0600). But it's something you work with by itself to increase your reading speed and not automatically with your existing reading. It will, however, let you take reading material of your choice and put that inside its speed-reading drills. ●

Get straight answers to your technical questions. Ask *PC Novice!* Send your questions, along with a phone and/or fax number so we can call you if necessary, to: PC Novice Q&A, P.O. Box 85380, Lincoln, NE 68501. Please include all version numbers for all software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

ACTION



EDITOR

When Ralph Nader can't be reached, bring your computer service problems to our Action Editor column. This page will help you find products, resolve service problems, and keep manufacturers alert to the critical issue of customer relations.

Are you having trouble finding a product or getting adequate service from a manufacturer? If so, we want to help solve your problem. Send us a description of the product you're seeking or the problem you've had with customer service. In billing disputes, include relevant information (such as account numbers or screen name for online services) and photocopies of checks. Include your phone number in case we need to contact you. Letters may be edited for length and clarity; volume prohibits individual reply. Write to:

**Action Editor
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120 W. Harvest Dr.
Lincoln, NE 68521**

or
Send E-mail to 74644.3017@compuserve.com

or
Fax us at (402) 479-2104

Dear Action Editor: (copy of letter sent to Parsons Technology)

I ordered your "free" Tax Mate software for a shipping/handling value of \$8.95 as advertised in PC Novice. A month later, I called your 800 number twice and was advised that shipping would be made later that month.

Today I called again and was referred to your customer service number. The person whom I spoke to had me spell my name twice and checked my name twice on your customer lists. I was told that my name does not appear on your list. I proposed sending him a copy of the canceled check as proof of my order. He said that if my name is not in the customer listing, my check had been cashed by someone else. It made me wonder why he is not interested in seeing this proof of payment.

Thank you for your time in reading this letter, and I hope you place some better-acting customer service personnel in that department.

Antonio Alolod, Jr.
Jersey City, NJ

We spoke with Parsons about Antonio's order and faxed the company a copy of his canceled check. A representative found no record of his order in their database but said the company would send Antonio his free software immediately.

Dear Action Editor:

Deciding to explore the Information Superhighway firsthand, I subscribed to Pipeline USA, a product offered by Performance Systems International (PSI) of Herndon, Va. For only \$19.95 a month, I had unlimited access to the Internet and the World Wide Web.

One night I couldn't get Netscape Navigator to run. Contacting tech support for Pipeline, I was told that I needed to upgrade to another PSI product, Interramp. I learned that I could get Interramp as part of a bundled software offer; they would send me Internet Valet at no cost and only bill my account \$9.99 for monthly usage. I subscribed. I followed this up by sending a fax asking that my Pipeline account be canceled.

Immediately upon its arrival, I loaded the Internet Valet. It was simple; it even assigned me an account number automatically. That later turned out to be a problem because I was supposed to enter an account number that would identify this as being free software. I only learned that after receiving a notice from my bank that they had charged a service fee of \$25 for paying a \$68 electronic draft that had caused my account to be overdrawn. PSI had charged me for "free" software and \$9.95 for Pipeline USA service.

[I called PSI and] the young lady was most gracious, offering to refund the \$68 and \$9.95 but stating she didn't have the authority to refund the \$25 bank service fee. Her supervisor told me it was my fault I had been charged. When I told her if she didn't credit my bank account or my Interramp account with \$25, I would cancel, she replied, "That's your choice." Needless to say, today I use a different Internet provider.

With my December bank statement came a \$9 draft by Performance Systems. I have no idea what the charge is for, and all attempts to contact the company have been futile.

I have some advice for your readers. Use only a credit card, not a debit card. If I had done so, the card-issuing company would now be fighting with PSI because I would have refused to pay the charges. Instead, PSI was able to take money directly from my checking account.

Robert A. Strong
Raleigh, NC

We contacted a PSI spokesperson who offered this explanation:

To get the special price of 99 cents for software with the Internet Valet offer, customers must enter a special account number. That number is sent to the customer with the package. Robert did not enter this special number, so \$50 was charged to his debit card for the software.

After Robert finally got through to a PSI representative, he was issued a credit for \$68 (\$50 for the software, \$9 for a registration fee, and \$9 for nine hours of use). It is not PSI's normal policy to issue such refunds because the error was Robert's when he failed to enter the special account number and because he used a debit card. (Vendors such as PSI cannot tell whether a customer is using a credit or debit card.)

PSI will not pay the \$25 bank fee because of a policy to pay service fees only if PSI commits an error to cause it.

PSI will issue Robert a credit of \$27 to cover his existing Internet Valet bill. He indicated in his phone conversation with PSI that he would cancel his subscription if the bank fee wasn't paid, but he never canceled the service. PSI will cancel his account, refund the cost of the months when he apparently believed he had canceled, and send a letter explaining the situation. ●



GLOSSARY

Of Terms

Bus—Copper tracings on the surface of the motherboard that transmit data between computer components.

Computer Telephony—A growing technology that works to combine the intelligence of computers with the utility of telephones.

Connect Time—The period during which a user is signed on, usually for a fee, to an online service, bulletin board system, host computer, or Internet service provider.

CPU—Central Processing Unit. Also called the microprocessor, this chip acts as the "brain" of a computer. It controls the computer's actions and can find, decode, and carry out instructions and assign tasks to other resources. Most IBM-compatible PCs use 386-, 486-, or Pentium-class chips designed by Intel.

Device Driver—A specific program that enables a computer to work with a particular device, such as a printer or a disk drive.

Disk Cache—A reserved portion of memory acting as a buffer between the central processing unit (CPU) and a disk. A disk cache may significantly expedite data retrieval. When a program requests data, the request first passes through the disk cache on its way to the storage device. If the data has been used recently, the program may quickly locate and retrieve the data from the disk cache rather than waste time searching the hard drive.

FAQ—Frequently Asked Questions. Common questions and answers about a certain topic. They're usually contained in a file or Internet site.

Hang—An unexpected halt of a computer system, usually while an application is running. The screen may appear to function properly, but there is no response from any input device.

HTML—Hypertext Markup Language. The standard language used in creating and formatting World Wide Web pages. HTML

documents are essentially text documents (as you would create in a word-processing program) that have tags embedded in them. These tags contain coding for text formatting, graphics, and hypertext links.

Intranet—An internal network based on Transmission Control Protocol/Internet Protocol (TCP/IP) and using tools such as Web browsers originally developed for use on the Internet.

ISDN—Integrated Services Digital Network. Special connections that use ordinary telephone lines to transmit digital instead of analog signals, allowing faster transmission via modem.

ISP—Internet Service Provider. Organizations that allow other computer users to dial in and connect to their Internet connection for a fee.

Lockup—A condition in which processing appears to be completely suspended and the program in control of the system will not accept any input.

MHz—Megahertz. Used to measure a computer system's speed, one megahertz is equivalent to 1 million cycles per second.

Online Service—A dial-up service such as CompuServe or America Online that provides news, information, and discussion forums for users with modem-equipped PCs and the access software required by the service.

PIF—Program Information File. A Windows file that provides information for running non-Windows programs.

Ports—Plug-like connectors on the back of a PC's case that let the machine communicate with peripheral devices such as mice and printers. Serial ports transmit data one bit of data at a time; parallel ports transmit data eight bits (one byte) at a time.

Protocol—A set of standards that assures that different network products can work

together. Any product using a given protocol should work with any other product using the same protocol.

RAM Drive—A portion of memory set aside to act as a hard drive. Information can be accessed quickly in a RAM drive, but all information stored there, unless stored to an actual drive, is lost when the computer is turned off.

Seek Time—The length of time required to move a read/write head to a particular location on a storage disk.

Swap File—A data file that has been temporarily transferred from the system's memory to the hard drive in order to free a portion of memory needed to accommodate an immediate memory demand.

Utility Software—An ancillary program that fulfills a necessary maintenance function for the computer system. Utility software is not native to an operating system (OS), although it might be packaged with an OS. Disk backup and antivirus detectors are two examples of utility software.

SLIP/PPP—Serial Line Interface Protocol/Point-to-Point Protocol. Two popular, standardized protocols governing the way desktop computers communicate with the Internet over a dial-up telephone line connection.

TCP/IP—Transmission Control Protocol/Internet Protocol. A popular communications protocol for defining the nature of input and output between devices.

TSRs—Terminate-And-Stay-Resident Programs. These programs, usually used in DOS, are loaded into memory and pop up when hotkeys are pressed.

Virus—An executable file that replicates itself and attaches itself to other executable programs in an unsolicited matter.

Web Browser—A program that provides an interface to the World Wide Web.

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IFC=Front Cover

IBC=Inside Back Cover

BC=Back Cover



Letters To The Editor

Dear *PC Novice*:

I would like to compliment you on your great magazine. I am a computer programmer for a leading department store and have to admit that even though I did get the education and background on computers and how they operate, I find myself lost when trying to read other magazines containing "geek speak."

I just received your May 1996 issue and would like to commend you on your new section entitled "Your Old PC." Buying a PC, whether new or old, can be a costly investment. Those who choose the path of buying an older machine, as I have done, need some guidance as to what's out there. This new section, hopefully, will help make my decisions much easier. Good job!

C. Parker/via CompuServe

Dear *PC Novice*:

Your editorial "Dissatisfaction Guaranteed" in the May 1996 issue very effectively summarized what is wrong in the computer industry. I am on my third computer, which I bought last July. I have more than 10 years of computer experience. Yet I have had numerous problems getting this new system to work. If I have problems, think about what a person with no computer knowledge must be experiencing.

You shouldn't have to be a computer engineer to get an electronic gadget to work. If the industry wants the masses to buy computers, they're going to have to do a much better job.

Don Hutchinson/Warrior, AL

Dear *PC Novice*:

Finally, there is a magazine that someone can sit down and read without having to put up with so much advertising that you lose sight of what you were there for in the first place. Your publication is straightforward and written in understandable language.

Since subscribing to your publication, I have canceled two other subscriptions to computer magazines.

I wouldn't hesitate to recommend your magazine to anyone. Keep up the wonderful job and give your editorial staff one tremendousatta-boy.

Ron Havranek/Minocqua, WI

CORRECTIONS/CLARIFICATIONS

In "Fine-Tuning Your CD-ROM Drive's Performance" (May 1996), we mistakenly referred to SMARTDrive's version as 5.0. The correct version is 4.0, with 4.2 being the latest release.

Letters to the Editor should be sent to: *PC Novice* / P.O. Box 85380, Lincoln, NE 68501-5380. Letters may be edited for clarity or space.



Certainly Uncertain

The Future Of Computers Is Hard To Foresee And Sure To Surprise

Making predictions about the computer industry is a little like filling out an NCAA basketball tournament bracket. Even the most well-considered prognostications are likely to prove wrong, and it's almost always because forecasters underestimate the industry's ability to surprise them. Princeton beats UCLA? You're nuts. Home PCs with 16MB of RAM? C'mon.

If you think the future of the computer industry eludes only outsiders, consider these sagacious statements:

"I think there is a world market for maybe five computers." — Thomas Watson, IBM chairman, 1943

"There is no reason anyone would want a computer in their home." — Ken Olson, Digital Equipment Corp. founder, 1977

"640KB ought to be enough for anybody." — Bill Gates, Microsoft chairman, 1981

Because our staff loves challenges (and doesn't think you'll study enough back issues to check up on our predictions), we've attempted to plot a course for the shifting sands of the PC industry. Don't be surprised if you read the following stories in the June 2006 issue of *PC Novice*:

■ Technology News

Go Ahead, Digitize My Day. The Duke, Clint, and Macaulay Culkin will soon share top billing in a new motion picture—even though the Duke died before Culkin (currently Hollywood's hottest action star) was born and Clint is now limited to watching old "Dirty Harry" flicks from his rocking chair.

The project from the PseudoStars film production company uses digitizing techniques to alter previously filmed images and create new roles for dead or retired actors.

■ PC Operating Instructions

Real Instant Startups. We've been content for a while now with PCs that start up in about seven seconds. But what if you're tired of the wait? You can be working at the flip of a switch with these simple steps that optimize your system's hardware-based startup instructions.

■ Computing Basics

Installing Holographic Peripherals. 1. Plug the cartridge into your system's case. 2. You're instantly viewing



three-dimensional images in the middle of the room instead of on that overused flat-panel display on the wall. Since configuration is automatic, most of the article offers tips for teasing pets with 3-D images.

■ General Computing Using The Back 40 (Megabytes).

Whether it's an idle 40 or 400MB, anyone who's had a PC more than six years has plenty of empty storage space. With all applications and storage now rented on the *One* (the collective information, entertainment, and monitoring source formerly called the 'Net'), there's little need for slow local storage. Here are some of our readers' best ideas for using that space, from making coasters out of old hard disks to storing sensitive files for the ultra-paranoid who still doubt the *One's* proven security.

■ At The Workplace

Returning To The Office. As mounting research demonstrates the social drawbacks of telecommuting, more companies are calling workers back to the office. For both young workers who have never made the daily commute and veterans returning to their cubicles, computing outside the home is an unfamiliar experience.

■ Beyond The Basics

Optimizing Optical Input. Eyestrain is a real threat for anyone who spends more time rolling their eyes than working when they navigate on-screen with retina-based input devices that aren't calibrated correctly. Our tips, and the right utility software, can have you opening files and working online quicker than a wink.

■ Your Old PC

Options For Software Loyalists. Plenty of users are still most comfortable installing software locally on their machines. Though they're getting harder to find, CD-based programs are still available, and some of them even run on a Pentium machine with just 64MB of RAM!

■ Editorial Comment

Killing Them With Kindness. Remember when we had to beg for adequate service? Well, when we asked for rain, we got a flood. Though users appreciate the thought, many are tired of tech support representatives calling once a week to make sure their systems are running OK. ●



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